THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

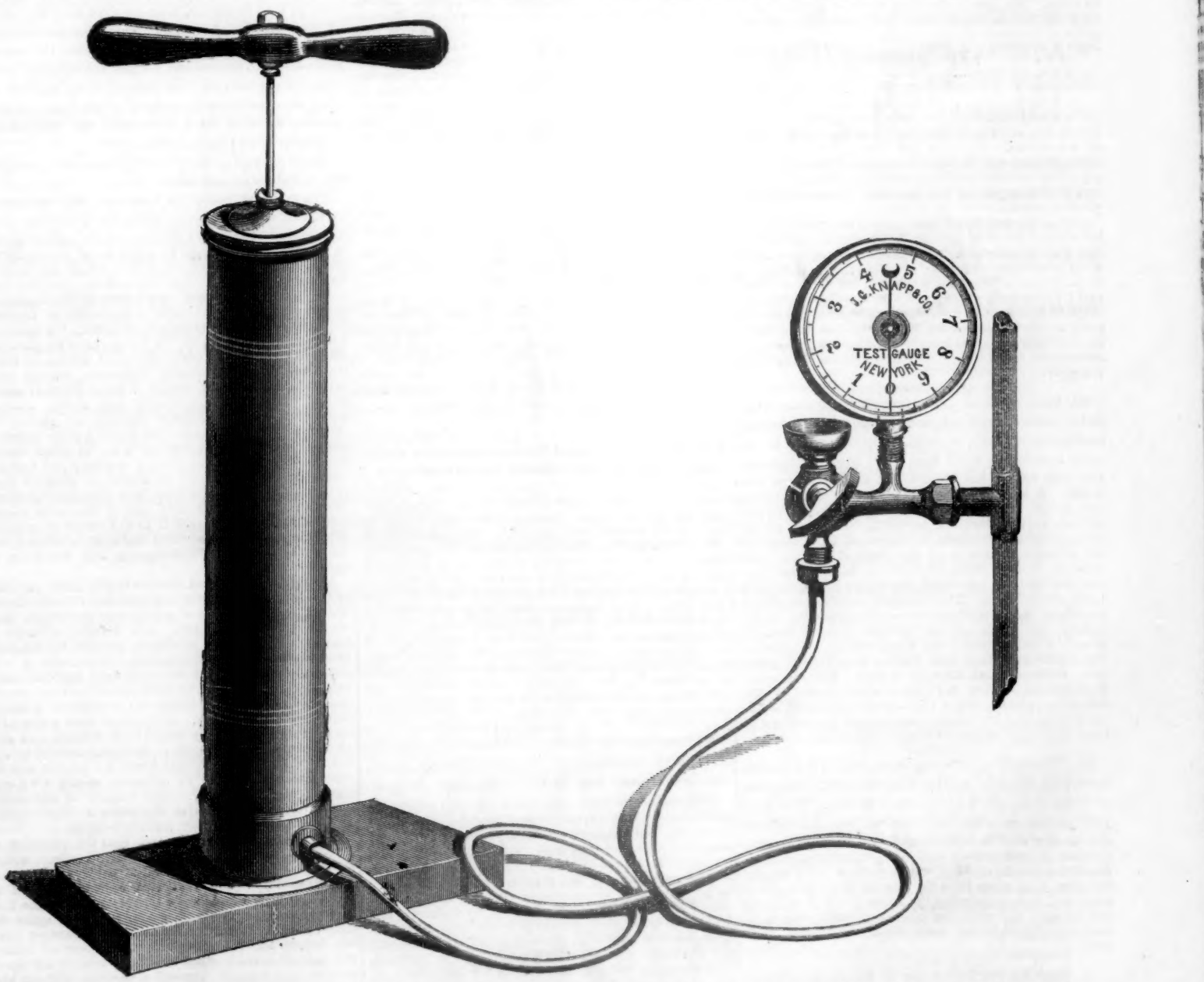
Publishing Office, No. 42 Pine Street.

Devoted to the Interests of Illumination, Heating, Ventilation and Sanitary Improvement, Domestic Economy, and General Science.

VOLUME XV.—No. 5.
WHOLE No. 250.

NEW YORK, SATURDAY, SEPTEMBER 2, 1871.

$3 PER ANNUM
IN ADVANCE.



J. G. Knapp & Co.'s Steel Diaphragm Gas-Fitters Test Gauge.

To gas-fitters and inspectors of gas pipes, the word Test Gauge has always been synonymous with a cast iron box containing a quantity of liquid mercury, and from which projected a long glass tube open at the top. This was known as the Mercury Gauge.

This gauge has always been a source of annoyance and expense to those who were obliged to use it, as it was necessary to carry it in an exact vertical position to prevent spilling the mercury, and great care was necessary so as not to break the glass tubes, and also to keep the numerous joints tight to prevent loss of mercury. There has been, at various times, attempts made at improvements with a view to obviate all these difficulties, but they have all been excelled and superseded by the gauge, an illustration of which we have

MORRIS, TASKER & CO.,

PASCAL IRON WORKS,

Corner Fifth and Tasker Streets, Philadelphia, and No. 15 Gold Street, New York.

Established 1821,

STEPHEN MORRIS, THOMAS T. TASKER, JR., STEPHEN P. M. TASKER.

FOR GAS WORKS MACHINERY, ADDRESS CORNER FIFTH AND TASKER STREETS, PHILADELPHIA.

Manufacturers and Builders of Gas Works, &c., of all Descriptions, of the Most Approved Plans.

WROUGHT IRON ROOF FRAMES.—For Slate, or Corrugated Iron Coverings, with Cast Iron Cornice Gutter. Iron Doors and Frames, Wrought Iron Pivot Blinds, Windows and all kinds of Castings and Smith Work for Buildings.

BENCH CASTINGS.—Retorts, and all Castings and Wrought Iron Work required for Setting them on the Latest Plan. Tar Gates, Wrought Iron Stand Pipes, Retort Lids, Cotter Bars, Coal and Coke Wagons, and Stokers' Tools.

EXHAUSTERS.—Exhausters and Compensators, By-Passes to pass from 4,000 to 150,000 Cubic feet of Gas per hour, with Engines, Governors, Pressure and Vacuum Guages.

SCRUBBERS.—Single or Multitubular Scrubbers, with Self-Acting Pumps for Ammonia Water.

WASHERS.—Cataract and Single and Multitubular Spray Washers.

CONDENSERS.—Single and Multitubular Air and Water Condensers.

PURIFIERS.—For Purifying from 1,000 to 2,000,000 cubic feet capacity daily, with either wet or dry Lime, or Oxide of Iron, and with either Ash Rivetted or Wrought or Cast Iron Lime Sieves.

CARRIAGES.—Movable Lifting Carriages for Purifiers, arranged either for Floor or Overhead use.

METERS.—Square and Round Meters of any capacity.

GAS HOLDERS.—Single Lift and Telescopic Gasholders, with Cast or Wrought Iron Suspension Frames.

GAS GOVERNORS.—Station Governors, with Regulating and Indicating Columns for Inlet and Outlet Pipes, also Dry Governors with Flexible Diaphragms for Underground Pipes.

STOP VALVES.—Double Faced Stop Valves for Gas or Water, from three inches to forty-eight inches diameter. These Valves are proved on both sides, with a heavy Water Pressure, Flange and Bell Pipes, Fittings and Drips of all descriptions. Steam Boilers and Hot Water Apparatus for Heating Building, and Gas Holder Tanks. Lamp Posts and Lanterns.

Best quality American Charcoal Iron Boiler Tubes. Wrought Iron Tubes from one-eighth of an inch to ten inches diam., with all kinds of Fittings, Valves and Cocks, Gas and Steam Fitters' Tools, and all articles connected with the manufacture of Gas, Steam or Water.

Sole Manufacturers of P. MUNZINGER's Patent Purifiers, Dry Center Seals, Adjustable Hydraulic Main Stand, Wooden Lime Trays, Stand and Straddle Pipes, and Multitubular Water Condenser.

MR. P. MUNZINGER, Gas Engineer, has been connected with our Establishment as Engineer and Designer, and in charge of the Gas Works Department for the past fifteen years.

Plans, Specifications, and Estimates furnished, for Lighting up Towns, Cities, Factories, and Public Buildings, etc., etc., with Gas from Coal, Rosin, or Wood.

We would refer to the Gas Machinery erected by us, and in operation, at the following places:

Philadelphia, Pa.
Williamsport, Pa.
Altoona, Pa.
Willkes Barre, Pa.
Honesdale, Pa.
Harrisburgh, Pa.
Erie, Pa.
Hanover, Pa.
Easton, Pa.
Lancaster, Pa.
Lock Haven, Pa.
McKeesport, Pa.
Allentown, Pa.
Lebanon, Pa.
Uniontown, Pa.
Washington, Pa.
Hudson City, N. J.
New Brunswick, N. J.
Salem, N. J.
Newark, N. J.
Freehold, N. J.
Englewood, N. J.
Jersey City, N. J.
Elizabeth, N. J.
Camden, N. J.
Flemington, N. J.

Metropolitan Works, N. Y. City.
Binghamton, N. Y.
Rome, N. Y.
Utica, N. Y.
Port Jervis, N. Y.
Elmira, N. Y.
Niagara Falls, N. Y.
Flat Bush, N. Y.
Westchester Co., N. Y.
Batavia, N. Y.
Fredonia, N. Y.
Columbus, Ohio.
Mansfield, Ohio.
People's Works, Cleveland, Ohio.
Newark, Ohio.
Salem, Ohio.
Wooster, Ohio.
People's Works, Chicago, Ill.
Chicago Gas-Light and Coke Co., Ill.
Jacksonville, Ill.
Peoria, Ill.
National Asylum for Discharged Volunteer Soldiers, Milwaukee, Wis.

Detroit, Mich.
La Porte, Ind.
Lawrence, Kansas.
Salem, Oregon.
Port-au-Prince, Cal.
San Jose, Cal.
Stockton, Cal.
Illinois State Penitentiary, Joliet.
Hartford, Conn.
Hagerstown, Md.
Peoples Works, Baltimore, Md.
Elkton, Md.
Milledgeville, Ga.
Augusta, Ga.
New Orleans, La.
Shreveport, La.
Louisiana Ice Manufacturing Co.
Nashville, Tenn.
Murfreesboro, Tenn.
Jackson, Miss.
Houston, Texas.
Galveston, Texas.
And a number of others.

☞ See page for Index to Advertisements.

THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

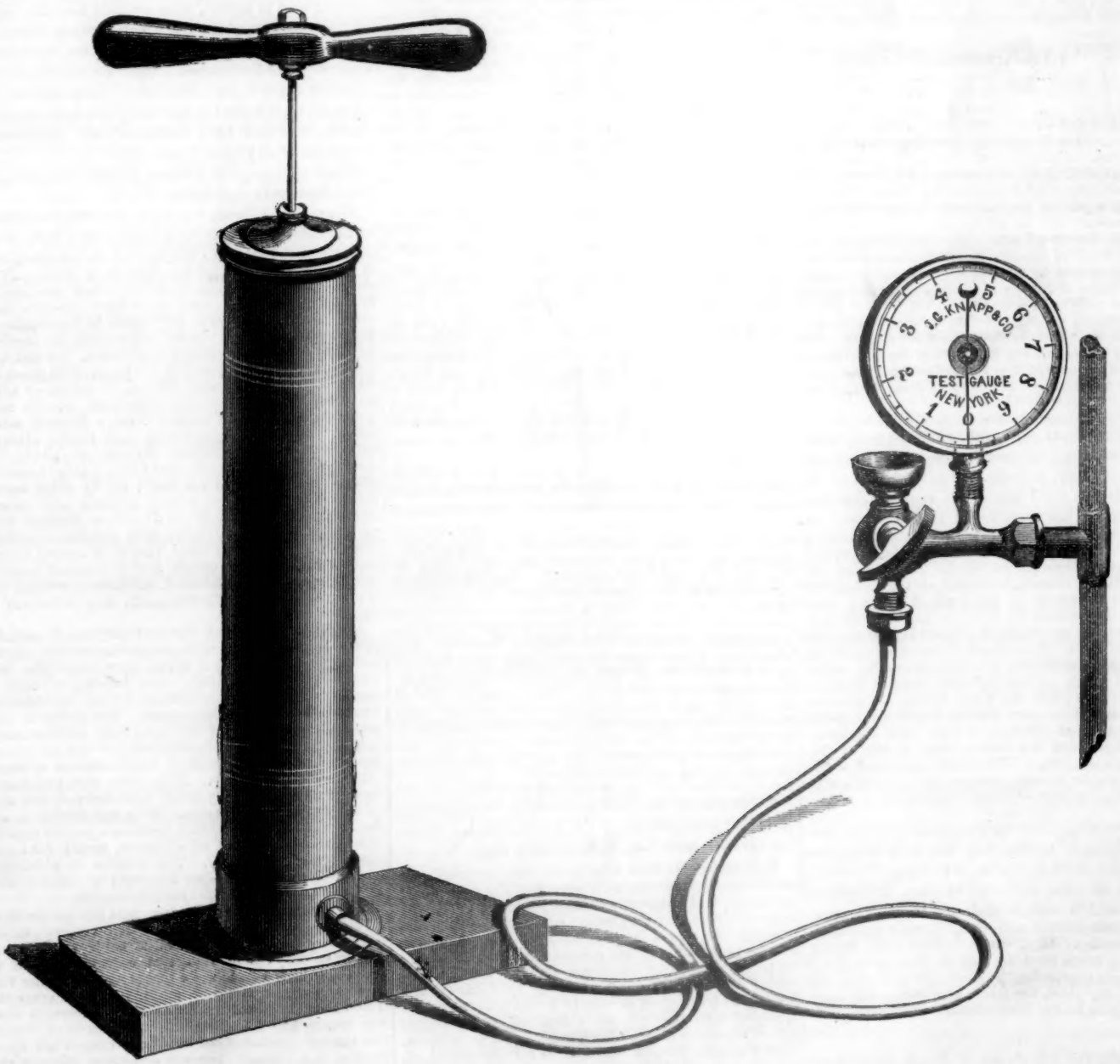
Publishing Office, No. 42 Pine Street.

Devoted to the Interests of Illumination, Heating, Ventilation and Sanitary Improvement, Domestic Economy, and General Science.

VOLUME XV.—No. 5.
WHOLE No. 250.

NEW YORK, SATURDAY, SEPTEMBER 2, 1871.

$3 PER ANNUM
IN ADVANCE.



J. G. Knapp & Co.'s Steel Diaphragm Gas-Fitters Test Gauge.

To gas-fitters and inspectors of gas pipes, the word Test Gauge has always been synonymous with a cast iron box containing a quantity of liquid mercury, and from which projected a long glass tube open at the top. This was known as the Mercury Gauge.

This gauge has always been a source of annoyance and expense to those who were obliged to use it, as it was necessary to carry it in an exact vertical position to prevent spilling the mercury, and great care was necessary so as not to break the glass tubes, and also to keep the numerous joints tight to prevent loss of mercury. There has been, at various times, attempts made at improvements with a view to obviate all these difficulties, but they have all been excelled and superseded by the gauge, an illustration of which we have

the pleasure of presenting to our readers in this issue.

This gauge is very compact and can be readily carried in the pocket: it is immaterial in what position it is carried or used; the dial is protected from breakage by a heavy brass cover. It has been endorsed by many of the most practical and scientific men in the gas business, and we feel no hesitation in giving it our hearty approval. They are manufactured by Messrs J. G. Knapp & Co., No. 26 Frankfort street, from whom all further information can be obtained.

Chemical Repertory,

No. 57.—September 2, 1871.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

49. Effect of "Hardness" of Drinking Water on Health.—In reference to the novel views of Dr. Letheby on this subject, we condense the following from a June number of the *Lond. Jour. of Gas-Lighting:*

Dr. Charles Wilson, an eminent physician in Edinburgh, during the late water controversy in that city adopted the conclusions of Dr. Letheby, but has considerably extended the observations on which they are grounded. He gives us a list of 65 towns, with their death rates, and the hardness of the water supplied to them. We give a summary abstract of the tables, in which the towns are classified according to the degrees of hardness of water supply:

Deg's of Hardness of Water.	Average Death-Rate per 1000 of Population.	Average Degree of Hardness.
Over 10 ...	21.9 ...	16
10 to 6 ...	24.9 ...	8
6 to 2 ...	26.3 ...	3.8
2 and under ...	28.5 ...	1.3

These lists include towns placed under every variety of conditions. There is but one thing comparable among them, and that is the quality of the water supply; and nothing can be clearer than that the death-rate increases just as the hardness of the water supplied decreases.

Our finest breeds of cattle have originated in the hard-water tracts of Lincoln, Leicester, York, Durham and Northumberland. Our finest horses, too, come from hard-water districts; "while, among the gneiss of Shetland and the Grampians and the slates of Wales and Cumberland, we have the diminutive Welsh and Highland sheep, the Herdwicks, the kylo, and the pony as the characteristic indigenous races." Here, at all events, is some food for reflection before we soften our water or go to a mountainous district for a supply.

50. Coal in India.—The following are some interesting statistics with reference to the newly-discovered coal mines of Berar, in India. The total area of the fields is stated at more than 1,000 square miles, and tho coal, so far, has been found at an easy working depth. A late boring at a place called Pisga struck coal at 77ft. from the surface, and pierced 30ft. of coal without passing through the seam. The area of one field, called the Damuda, is stated at 149 miles, and the average thickness of the seam at 40ft., a total amount of coal which Dr. Oldham has estimated at 484,000,000 tons, but which the report calculates to be 4,840,000,000 tons. The estimate, the resident states, would, at the present rate of consumption in India, last for 800 years. Some valuable beds of iron ore hlso have been found in the Woon district. Probably, the report says, they were worked hundreds of years ago, and abandoned for want of fuel. The minimum thickness of some of the beds is stated at 9ft. of ore, but in one place a bed of 177ft. thick was found. The ore is supposed to contain an average percentage of from 53 to 68.5 of iron.—*London Artizan.*

51. "Kerosene."—Twenty-three dealers in kerosene have been found in one block in this city. Only one of them could afford to take out a license. The competition was so great that some of them adulterated the oil they sold in order to undersell their neighbors, making it both unsafe and comparatively worthless. Nearly one-tenth of all the fires in New York during the past year arose from the use of dangerous kerosene, and if, by regulating the trade, life and property can be made any safer, the whole community will have reason to rejoice in the innovation.—*American Artisan.*

52. Test for the Detection of Small Quantities of Sulphur Present in Coal-Gas.—Dr. V. Wartha.—The author forms, first, before the blow-pipe, in the loop of a platinum wire, a bead of pure soda, and next passes this bead over the edge of the gas flame, after which the bead is held in the interior of the flame in order to deoxodize the sulphates and sulphites of soda into sulphuret of sodium; the bead is then transferred to a porcelain basin, cruched, and some nitro-prusside of sodium added, whereby the smallest trace of sulphur will be detected. This reaction is fifty times more sensitive than that upon silver foil; and the test can be performed in about three minutes, whereas Dr. Vogel's sulphur-copper reaction for this purpose takes four hours.—*Chemical News.*

53. Dietary Chemistry.—The *Jour. Applied Chemistry* tells us:

When the bone, fat, and water are deducted from butcher's meat, as usually purchased for family use, the residuum is obtained at high cost. In bread, every hundred pounds weight is found to contain 80 pounds of nutritious matter; butcher's meat, averaging the various sorts, contains only 31 pounds. Turnips, which are the most aqueous of all vegetables used for domestic purposes, furnish only 8 pounds of nutritious substance in 100 pounds; carrots 14 pounds, and what is remarkable as being in opposition to the hitherto acknowledged theory, 100 pounds potatoes yield only 25 pounds of substance which is nutritious. According to this estimate, 1 pound of good bread is equal to 3 pounds of potatoes, 75 pounds of bread, and 30 pounds of butcher's meat are equal to 300 pounds of potatoes, showing that, for the sake of economy, this vegetable cannot be profitably used, except when it can be obtained at a low cost. Eggs though nutritious in some respects cannot support life without the addition of some other food containing phosphates. Liebig says, "With meat, we are able to sustain the life of a carnivorous animal, but not so with eggs; a dog eats the egg, but does not digest it; and in the presence of a dishful of boiled albumen, or boiled yelks of eggs, or of both together, he will die of starvation." On the other hand rice, which contains the phosphate, is wanting in albumen, and must be eaten in conjunction with meat or milk to supply this deficiency. If the matter of diet were more thoroughly looked into, increased health would frequently be obtained at a saving of expense.

54. Culinary Dicta.—Man is a cooking animal. Blot, the Professor of the great art of cookery, says that green vegetables, such as cabbage, spinach, etc., should be put in boiling water, but dry vegetables, as beans, and peas, should be put in cold water to cook, after having been previously soaked in lukewarm water. In the case of potatoes, the eyes or germs are to be cut out, and the skin rubbed or scraped off, then steamed or roasted. He thinks that fish, although only containing 20 per cent. of nutritious matter, ought to be partaken of at least twice a week, as it contains more phosphorus than any other food, and serves to supply the waste of that substance in the system, and particularly in the brain.

55. Sugar Production and Consumption.—It is estimated that the United States' consumption of cane sugar in the year 1870 exceeded 551,000 tons, and that there was also consumed about 32,000 tons of sugar made from molasses, and 23,000 tons of maple sugar, making, in the whole, about 606,500 tons, being an increase of 32,000 tons over 1869. The prolific fields of the Spanish West Indies contribute the great bulk of the supply. The crop in Louisiana in 1869–70 is estimated at 87,000 hhds., a yield thought likely to be substantially exceeded by the crop of 1870–71. It is stated that a little sugar has been made from the beet in Wisconsin, Illinois, and California, but not in sufficient quantity to require more than a passing note of it; and the same remark applies to the yield of sugar from the Sorgho plant. The latter is cultivated chiefly for its syrup, and the manufacture of the former has not advanced yet beyond what may be termed an experimental step.—*London Artizan.*

56. Domestic Economy in Schools.—Commenting on some recent reforms of the London School Board, the *London Journal of Gas-Lighting says:*

Some leader writers, who know nothing practically about the question, are indignant that drawing should be taught and domestic economy passed over. By domestic economy they mean cooking, washing, and ironing. It was a lady member of the Board who sensibly pointed out that practical cookery could not be taught unless at enormous expense, because few would eat the trial meals prepared by children, and few would trust their clothes to infant washerwomen. Washing is so simple an operation that any intelligent girl will learn it in a week's practice; as to cooking, what sort of a kitchen would serve for the school of, say, fifty girls? But although the Board cannot be recommended by any person who knows the questions practically, to invest in kitchen-ranges, saucepans, gridirons, and washing-tubs, a great deal might be done by useful books, which would teach first principles. Really sensible school-books, on every subject of useful information, such as William Cobbett would have written if he had not hated any one, are the greatest wants of modern educators. The ordinary run of educational food is more like sawdust in the mouth than wholesome bread. Soyer or Miss Acton could, had they lived, have produced a book which any girl of twelve could, had they lived, have produced a book which any girl of twelve could have comprehended and enjoyed, describing the various kinds of food in ordinary use and the principles on which boiling, simmering, stewing, broiling, frying, roasting, should be conducted. Nothing in the way of elaborate or expensive preparations should be referred to or attempted, but the importance of degrees of heat, and proportions in weights and measures should be impressed. A girl who understands the first principles of cookery will soon take to the practical part, and, if she can read fluently, learn all worth learning. The same sort of education may be applied to water and soap—the chemistry of clean linen—as regards washing. Let Professor Huxley, Mrs. Garrett-Anderson, and Miss Davis turn their attention to books on domestic economy, the natural history of domestic labor-saving and edible animals. An intelligent demand will create an intelligent supply.

[Original Communication.]

Suggestions Upon the Nature of Heat.

By A. Gilkeson, of New York.

When we shall have solved the problem of the relations of heat to matter, then we shall have the key to all the mysteries of Nature. This great question has troubled the minds of philosophers from the earliest times down to the present. Upon the solution of this question depends the perfection of every science; for when we once know the laws by which heat acts upon matter, we shall have discovered the fundamental principles of all physical phenomena.

There are two great theories of heat—the material, and vibratory or correlative.

The material theory has been very ably maintained by the calorists, who have produced facts from every department of science; and that of the correlationists is forcibly demonstrated by a system of admirable experiments, the most convincing of which are those of Rumford and Joule. But when both theories have been closely examined we are forced to the conclusion that heat is neither matter, nor a mode of motion; but that it is, in the language of Bacon, "a spirit, or body pneumatical which fills the pores of all gross bodies; that it is not some virtue, or action, or trifle, but a *real* and *quantitative* substance, though rare, invisible and without weight"! or as Newton maintains, "an exceedingly subtile and elastic ethereal substance, which is diffused through all places, fills the pores of gross bodies, and forms a large constituent of their bulk or volume"; or, in other words, that heat is a substance having quantity and volume, but without weight, and is, therefore distinct from ponderable matter. Newton held that this substance fills all space, for the reason that it is absurd to conceive a vacuum, and that it is the cause of gravity, cohesion, capillary attraction, solution, elasticity, and the emission, reflection, refraction and inflection of light.

Matter is made up of inconceivably small particles called atoms, which are impenetrable by this all-pervading fluid, heat; for if atoms were penetrable they would lose their identity. The identity of atoms is always preserved, as is clearly proved by chemical combination and decomposition. The atoms of oxygen unite with those of carbon to form carbonic acid, and the compound can be decomposed and the constituents reunited a thousand times without a single atom losing its identity. If the atom were penetrable by heat its indivisibility would be destroyed, and also all its combining properties. With this state of things the laws of chemistry would become a jumble and no element, or compound of elements, would for a moment retain its identity. The science of chemistry has developed the fact that the atom is impenetrable and indivisible, and hence its individuality.

The calorists say that the fact that the particles of all bodies are surrounded by an elastic medium, which prevents their actual contact, is evident from their compressibility; and that this medium is heat is proved by facts which show that it augments the volume of solids, liquids, and gases, which are again reduced to their former dimensions by abstracting what was before added. Accepting the theory of atoms, and that of Newton, that one body cannot act upon another at a distance through a vacuum, without the mediation of something else, by and through which their action and force may be conveyed from one to another, we must come to the conclusion that this something else which fills space and the pores of bodies is heat. For heat is disengaged during chemical combination—the union of substances having chemical affinity for each other is accompanied by increase

of temperature, and in cases where the affinity is great the bodies become luminous—a large amount of heat being evolved which produces what is called combination.

Again, those who maintain the material theory ask, if heat were only the effect of vibratory motion among the particles of ponderable matter, how could it radiate from hot bodies without the simultaneous transition of the vibratory particles! And they assert that when iron, copper, and other metals are heated to any temperature below the point of ignition, like boiling water, they give off heat freely, without any sensible loss of ponderable matter. Experiments by Berthollet, Biot and Pictet have shown that when pieces of gold, silver, and copper were suddenly and forcibly struck they were condensed, and heat evolved, but when they arrived at the limit of condensation, there was no perceptible increase of temperature. The fact of the smith kindling his fire by hammering a piece of iron to red heat, is brought forward to prove that the pores of bodies are filled with (latent) heat. But it has been demonstrated by others that the same piece of iron after cooling can be heated again by hammering. This is cited by the correlationists as a point in favor of their theory. The calorists say, that if heat is a mode of motion, it ought to be generated by all impulses which throw the particles of bodies into a state of violent agitation, but, they say, such is not the fact; for if the atmosphere, the ocean, and the solid strata of the earth were kept in a state of perpetual tremor, their temperature would not be materially altered; and also, that the advocates of the correlative theory have never explained what causes bodies to vibrate; nor what keeps the particles of solids, liquids, and gases at a distance from each other while quiescent, or free from vibratory motion.

The correlationists, or those who believe that the essential nature of heat is motion, bring forward the admirable experiments of Rumford and Joule. which they hold are conclusive evidence that heat can be correlated with motion. Rumford, from his great experiment with the cannon, by which the temperature of 18.77 lbs. of water was raised from 60° to 107° in one hour with a force of about 10,000 lbs., in thirty minutes more to 140°, in two hours to 178°, and in two hours and a half to 210°, came to the conclusion that heat was not material, but the effect of motion; that the force or motion produced by the horse-power employed, was transmuted into heat. The dispute between the two parties here, is about the specific heat of the scales detached from the bottom of the cylinder. Rumford said that the specific heat of the scales was the same as that of an equal weight of solid iron, and hence his conclusion, for there was a much larger amount of heat produced than could have been stored up in the scales before they were detached. It seems very convincing that the heat evolved must have come from other sources than the pores of the iron. Joule has since fully investigated this subject, and his conclusions are: That the quantity of heat produced by the friction of bodies, whether solid or liquid, is always proportional to the force expended. That the quantity of heat capable of increasing the temperature of one pound of water 1°, requires for its evolution the expenditure of a mechanical force represented by the fall of 772 foot-pounds. This he called the unit of heat.

[To be concluded.]

[Communicated by the Author.]

Report of the Rock Oil, or Petroleum, From Venango Co., Pennsylvania.

With special reference to its use for illumination and other purposes.

By B. Silliman, Jr.

Professor of General and Applied Chemistry, Yale College.

REPORT.

New Haven, April 16, 1871.

Messrs. Eveleth, Bissell & Reed,

Gentlemen: I herewith offer you the results of my somewhat extended researches upon the Rock Oil, or Petroleum, from Venango County, Pennsylvania, which you have requested me to examine with reference to its value for economical purposes.

Numerous localities, well known in different parts of the world, furnish an oily fluid exuding from the surface of the earth, sometimes alone in "tar springs," as they are called in the western United States; frequently it is fonnd floating upon the surface of water in a thin film, with rainbow colors, or in dark globules, that may, by mechanical means, be separated from the fluid on which it swims.

In some places wells are sunk for the purpose of accumulating the product in a situation convenient for collection by pumping the water out. The oil exudes on the shores of Lakes and Lagoons, or rises from springs beneath the beds of Rivers. Such are the springs of Baku, in Persia, and the wells of Amiano, in the duchy of Parma, in Italy. The usual geological position of the rocks furnishing this natural product, is in the coal measures—but it is by no means confined to this group of rocks, since it has been found in deposits much more recent, and also in those that are older—but in whatever deposits it may occur, it is uniformly regarded as a product of vegetable decomposition. Whether this decomposition has been effected by fermentation only, or by the aid of an elevated temperature, and distilled by heated vapor, is perhaps hardly settled.

It is interesting, however, in this connection to remember, that the distillation, at an elevated temperature, of certain black bituminous shales in England and France, has furnished large quantities of an oil having many points of resemblance with Naphtha, the name given to this colorless oil, which is the usual product of distilling Petroleum. The very high boiling point of most of the products of the distillation of the Rock Oil from Venango County, Pa., would seem to indicate that it was a pyrogenic (fire produced) product.

Bitumen, Asphaltum, Mineral Pitch, Chapapote, etc., etc., are names variously given to the more or less hard, black resinous substance which is produced usually from the exposure of Petroleum to the air, and is found either with or without the fluid Naphtha or Petroleum. The most remarkable examples of the occurrence of these substances, so intimately connected with the history of Rock Oil, are the Lake Asphaltites or the Dead Sea, so memorable in history, the well known Bitumen Lake of Trinidad, and the deposits of mineral pitch or Chapapote in Cuba. In one of the provinces of India, vast quantities of Petroleum are annually produced, the chief consnmption being local, for fuel and lights, but a portion is also exported to Europe for the production of Naphtha. In the United States, many points on the Ohio and its tributaries, are noted as producing this oil; nearly all of them within the coal measures. A detailed history of these various localities can be found recorded in books of science, and their repetition here would be out of place.

GENERAL CHARACTERS OF THE CRUDE PRODUCT.

The Crude oil, as gathered on your lands, has a dark brown color, which, by reflected light, is greenish or bluish. It is thick even in warm weather—about as thick as thin molasses. In very cold weather it is somewhat more stiff, but can always be poured from a bottle even at 15° below zero. Its odor is strong and peculiar, and recalls to those who are familiar with it, the smell of Bitumen and Naphtha. Exposed for a long time to the air, it does not thicken or form a skin on its surface, and, in no sense, can it be called a drying oil. The density of the Crude oil is .882, water being 1.000. It boils at a very high temperature, and yet it begins to give off a vapor at a temperature not greatly above that of boiling water. It takes fire with some difficulty, and burns with an abundant smoky flame. It stains paper with the appearance of ordinary fat oils, and feels smooth and greasy between the fingers. It is frequently used in its crude state to lubricate coarse machinery. In chemical characters, it is entirely unlike the fat oils. Most of these characters are common to Petroleum from various places. In one important respect, however, the product of your lands differs from that obtained in other situations, that is, it does not, by continued exposure to the air, become hard and resinous like mineral pitch or bitumen. I have been informed by those who have visited the locality, that on the surface of the earth above the springs which furnish your oil, there is no crust or deposit of this sort such as I have seen in other situations where Petroleum or mineral tar is flowing. This difference will be seen to be of considerable importance, as it is understood and represented that this product exists in great abundance upon your property, that it can be gathered wherever a well is sunk in the soil, over a great number of acres, and that it is unfailing in its yield from year to year. The question naturally arises, of what value is it in the arts, and for what uses can it be employed? To enable you to answer these inquiries has been the object of my researches.

EXAMINATION OF THE OIL.

To determine what products might be obtained in the oil, a portion of it was submitted to fractional distillation.* The temperature of the fluid was constantly regulated by a thermometer, the heat being applied first by a water bath, and then by a bath of linseed oil. This experiment was founded upon the belief that the crude product contained several distinct oils, having different boiling points. The quantity of material used in this experiment, was 304 grammes. The thermometer indicated the degrees of the Centigrade scale, but, for convenience, the corresponding degrees of Fahrenheit's scale are added. The water bath failed to distil any portion of the oil at 100°C. (=212°Fah.) only a small quantity of acid water came over. An oil bath, (linseed oil,) was then substituted, and the temperature was regularly raised by slow degrees until distillation commenced. From that point the heat was successively raised by stages of ten degrees, allowing full time at each stage for complete distillation of all that would rise at that temperature before advancing to the next stage. The results of this tedious process are given in the annexed table—304 Grammes of Crude oil, submitted to fractional distillation, gave:

	Temperature.	Quantity.
1st Prod.	at 100°C.=212°Fah. (acid water,)	5 Gms.
2d "	" 140°C.to150°C.=284°to302° Fah.	26 "
3d "	" 150°C.to160°C.=302°to320° Fah.	29 "
4th "	" 160°C.to170°C.=320°to338° Fah.	38 "
5th "	" 170°C.to180°C.=338°to356° Fah.	17 "
6th "	" 180°C.to200°C.=356°to392° Fah.	16 "
7th "	" 200°C.to220°C.=392°to428° Fah.	17 "
8th "	" 220°C.to270°C.=428°to518° Fah.	12 "
Whole quantity distilled by this method.....		160
Leaving residue in the retort.....		144
Original quantity.....		304

Product No. 1, as above remarked, was almost entirely water, with a few drops of colorless oil, having an odor similar to the original fluid, but less intense.

Product No. 2 was an oil perfectly colorless, very thin and limpid, and having an exceedingly persistent odor, similar to the crude oil, but less intense.

Product No. 3 was tinged slightly yellow, perfectly transparent, and apparently as limpid as the 2d product, with the same odor.

Product No. 4 was more decidedly yellowish than the last, but was in no other respect distinguishable from it.

Product No. 5 was more highly colored, thicker in consistence, and had a decided empyreumatic odor.

Product No. 6. This and the two subsequent products were each more highly colored and denser than the preceding. The last product had the color and consistency of honey, and the odor was less penetrating than that of the preceding oils. The mass of crude product remaining in the retort, (equal 47.4 per cent.,) was a dark, thick, resinous-looking varnish, which was so stiff, when cold, that it could be inverted without spilling. This showed no disposition to harden or skin over by exposure to the air. The distillation was arrested at this point in glass, by our having reached the limit of temperature for a bath of linseed oil. The *density* of the several products of this distillation, shows a progressive increase, thus:

No. 2.....	density	.733
No. 3.....	"	.752
No. 4.....	"	.766
No. 5.....	"	.776
No. 6.....	"	.800
No. 7.....	"	.848
No. 8.....	"	.854

To form an idea of the comparative density of these several products, it may be well to state, that Sulphuric Ether, which is one of the lightest fluids known, has a density of .736, and Alcohol, when absolutely pure, .800.

The *boiling points* of these several fluids present some anomalies, but are usually progressive, thus, No. 2 gave signs of boiling at 115 deg. C. (=239 Fah.) and boiled vigorously, and remained constant at 225 deg. C. to 228 deg. C, (=437 to 442 deg. Fah.) No. 3 began to boil at 120 deg., (=248 deg. Fah.,) rose to 270 deg. (=518 Fah.,) where it remained constant. No. 4 began to vaporise at 140 deg., (=284 deg. Fah.,) rose to 290 deg., (=554 deg. Fah.,) where it remained constant. On a second heating the temperature continued to rise, and passed 305 deg., (=581 Fah.) No. 5 gave appearance of boiling at 160 deg., (=320 Fah.,) boiling more vigorously as the heat was raised, and was still rising at 308 deg., (=581 deg. Fah.,) No. 6 commenced boiling at 135 deg., (=275 Fah.,) boiled violently at 160 degrees (=320 degrees Fahrenheit,) and continued rising above the range of the mercurial thermometer. No 7 commenced ebullition at the same temperature as No. 6, and rose to 305 deg, (=581 deg. Fah.,) where the ebullition was not very active. Much time was consumed in obtaining these results. We infer from them that the Rock Oil is a mixture of numerous compounds, all having essentially the same chemical constitution, but differing in density and boiling points, and capable of separation from each other, by a well-regulated heat.

The uncertainty of the boiling points indicates that the products obtained at the temperatures named above, were still mixtures of others, and the question forces itself upon us, whether these several oils are to be regarded as *educts*, (i. e. bodies previously existing, and simply separated in the process of distillation,) or whether they are not rather produced by the heat and chemical change in the process of distilla-

* Fractional distillation is a process intended to separate various products in mixture, and having unlike boiling points, by keeping the mixture contained in an alembic, at regulated successive stages of temperature as long as there is any distillate at a given point, and then raising the heat to another degree, etc.

tion. The continued application of an elevated temperature alone is sufficient to effect changes in the constitution of many organic products, evolving new bodies not before existing in the original substance.

[To be concluded.]

British Association of Gas Managers, June 14, 1871.

Mr. James Eldridge (Richmond) read the following paper:

ON THE APPARATUS FOR, AND METHOD OF, MANUFACTURING SULPHATE OF AMMONIA, SUITABLE FOR SMALL GAS WORKS.

When we met at Nottingham in 1867, Mr. Esson and Mr. Anderson read papers on the manufacture of sulphate of ammonia. I felt much interested in them, because the works of which I have the charge are nearly a mile from either river or rail, and we were for years obliged to dispose of our liquor at a loss; this led me to attach considerable importance to the valuable suggestions made by those gentlemen. Since then I have erected a small plant which has proved so successful that, with the permission of our committee, I beg to lay before you a brief description of it, with the results of its working.

My remarks are especially designed for the consideration of those who are managers of comparatively small works, who find their liquor a source of trouble, and the returns for which are not satisfactory.

Mr. Anderson says (page 14, report of 1867): "Numerous gas companies find their ammoniacal liquor a nuisance, and the respective communities they supply are universally getting more sensitive in the nose, so that unless it can be sold or given away, the question of what is to be done with it is becoming every day most urgent." This was just the case with us; we could sell it, but the price realized did not pay the cost of its removal from the works to the barge, and we were threatened with legal proceedings for conveying it through the village to the waterside. Some gas companies put it in their pits, with what destructive results I need not state. Some that I know dig a deep well and let it soak away into the earth, and eventually into wells in the neighborhood.

I have had my small apparatus in operation about two years. There is nothing new in its general principles; it is much the same as Mr. Anderson's, shown in plate No. 5, in tne report of 1867, and as described by Mr. Esson page 20, when he says: "A step in advance of this arrangement is that one in which the liquor is pumped into a boiler. Along with the liquor, a proper quantity of shell lime is put, which sets free the fixed ammonia. From this boiler a suitable pipe conducts the ammoniacal steam to a saturating vessel of proper construction, lined with lead, and into which the sulphuric acid is put. The salts formed in the saturator are removed as they form, and more acid added as the case demands."

I do not say that the plan I have adopted is the most economical where you have to make a very large quantity, but I found it has the following important advantages: It is very simple, requires no steam, very little attention, and is free from offensive smell. I will now give you a brief description of it, with results as to profit, compared with our former mode of disposing of our liquor.

The gas is scrubbed with liquor till it shows about 7 degs. of strength on Twaddle's hydrometer, or about 15 ounce liquor. It is then pumped into a settling-tank, from which it is conveyed through a pipe laid to a fall into a boiler 9 feet by 4 feet, which will work off about 5000 gallons.

As it does not require a very great heat, the boiler is set over an ordinary furnace on a 4½-inch brick arch, so that no fire comes in direct contact with the boiler. Connected to the boiler, and leading to the saturator, is a 2-inch pipe, the top part of which is iron, and the bottom part is the shape of a S, and is perforated.

The saturating tank is then charged with brown acid of about 80°, the first charge of which is diluted with about three gallons of water to a hundredweight of acid; but afterwards we use another liquor instead of water. Upon the application of heat to the boiler, the ammoniacal steam is driven over through the 2-in. pipe into contact with the acid. In about 18 hours the whole of the ammonia (or nearly the whole) will be driven over from the liquor into the boiler, and formed into salts at the bottom of the saturator; the spent liquor is then run off from the boiler, and the salts removed with the liquor into a cooling-pan, the saturator and boiler being again ready for charging in the same way. This occupies but a short time, and they are soon at work again. The salts are fished out of the cooling-pan and laid on a sloping tank lined with lead, the foot of the incline being perforated, so that the liquor may be drained from it and applied to the next charge. The process thus goes on every day except Sunday. As soon as the salts are sufficiently dry, they are put into a storage-tank lined with lead, with an outlet at the bottom to carry off any small amount of moisture that may still be left in them; by this means we have no loss from the dissolving of the salts through damp weather and other causes.

In order to prevent any perceptible diffusion of objectionable gases, the saturating-tank is provided with a wooden covering, and in it is fixed a six-inch pipe, the upper end of which is built into the chimney. The whole of the sulphuretted hydrogen is effectually carried off through this pipe into the chimney, so that there is really nothing offensive in the process.

Financially, the results may be stated in my case thus:

To Acid.....	£160 0 0	By 34 tons sulphate at £15, less 2½ p. c.	$497 5 0
Labor.....	25 0 0		
Fuel.....	40 0 0		
Profit.....	302 5 0		
	£497 5 0		$497 5 0

We thus realized a net profit of £302 5s., a sum not to be despised, particularly when we consider that it arose from the conversion of what might otherwise have been an intolerable nuisance.

Before I commenced, I not only studied the papers to which I have alluded, but visited several works where it was made, and in my opinion the process adopted by Mr. Stout, of Boston, was the best. Mine is very similar, differing only in a few details, which I think are improvements.

I am aware these few plain remarks on rather an important subject are not of that scientific character to which you are accustomed to listen on occasions like this, but I trust the few minutes occupied in reading this paper will not be vain, and that my endeavor to discharge a duty I feel that I owe to the association, by contributing, in however small a degree, anything of a practical character, that may possibly be of service to some one, will meet with your indulgence.

I think it desirable that our papers should be short, and I have not, therefore, gone so minutely into the matter as I might have done, but should any gentleman present wish further particulars, I shall feel a pleasure in giving him any information in my power.

Mr. Cox (Sunderland) asked how many tons of coal carbonized were represented by the £302 profit on sulphate made.

Mr. Eldridge said about 6,500 tons

Mr. Baker said this was a subject in which he took a great interest, for he had been a sulphate of ammonia maker for the last 25 years. He found that from 1576 tons of coal he could produce 19¾ tons of sulphate.

Mr. Eldridge remarked that he had never heard of such a thing before.

Mr. Baker said he had a boiler which held 200 gallons, and he boiled it by steam. The ammoniacal gas came off with the steam very readily in seven hours. This appeared to him to be the only difference between his and Mr. Eldridge's process. He had used his present apparatus about 14 years. He was sorry that he had not taken out the financial details of the manufacture, so as to be able to lay them before the meeting; he could only say that the results were exceedingly good. He recommended every manager who had any difficulty in disposing of his gas liquor to work it up. There was no nuisance whatever in the operation, as the saturating vessel was covered over, and a pipe from it carried off the gas to the boiler.

Mr. Broadhead asked what was the strength of the liquor when Mr. Eldridge commenced to work it up.

Mr. Eldridge said he made his sulphate of about 16 ounce liquor.

Mr. Miles asked whether in a small work, where 1500 tons of coal annually were carbonized, it would be profitable to put up a scrubber, and use it for the purpose of getting a strong ammoniacal liquor.

Mr. Eldridge had no hesitation in saying that it would pay to put up a little apparatus. Mr. Miles said, "Put up a scrubber." He (Eldridge) took it for granted that there was no gas work in existence, of any size, without a scrubber. On the previous day there was a remark made about scrubbing too much; for his own part, he would like to scrub much more. He was sure, from experience, that it was profitable in every way to thoroughly scrub the gas, and use the liquor over and over again, so as to get it up to 16 oz. strength. The scrubber very much assisted to remove a large quantity of impurity, which could not otherwise be got out of the gas. He had found that it answered well, in addition to the ordinary scrubbing, to take the liquor as it came from the hydraulic, and work it through the scrubber till it showed 16 oz. strength, and then to use a second scrubber with water.

Mr. Miles said at the works he was speaking about they had no scrubber, but a bell washer, consequently the water was not so strong as it might be. He had been told, in the course of conversation with a gas manager, that the very strongest ammoniacal liquor was not the best for making sulphate.

Mr. Eldridge said he liked to get it as strong as he could.

Mr. Anderson (Bath), from personal experience, believed that more salt could be obtained out of liquor of 5° Twaddle than of 12° Twaddle. The manufacture of sulphate of ammonia was a question which all managers—especially those connected with small works—should go into, because it could be profitably undertaken, and got rid of a nuisance. He manufactured his salts upon the same principle as that detailed in the paper just read.

Mr. Stout (Boston) said he had been engaged in the manufacture of sulphate of ammonia for many years, and he was always glad that he took it up. Before he commenced manufacturing the article the water was either lost, or given away, or destroyed, but he had long since found that it paid well to work it up. His experience taught him that the stronger the liquor the more sulphate he obtained in quantity and the better the quality. The process was a very simple one, and any manager of gas-works could take it up if he chose. He need not go to any great expense for machinery; all he required was a boiler, a saturator, and a drainer, and any one who was desirous to see the procees of manufacture, was welcome to inspect his operations. It appeared to him to be a shame ever to allow an article of such value as ammoniacal liquor to be destroyed. His own opinion was there was a good time coming for sulphate makers, inasmuch as the supplies of Peruvian guano were failing. Gas liquor contained the same fertilising agent—ammonia—and it was already fetching an excellent price in the market. If he could make twenty times the quantity he had hitherto done he could dispose of it at £19 a ton. He did not make the very whitest salt, because he sold to manure makers, who looked rather for quantity than quality.

Mr. Craven asked Mr. Stout how many tons of coal he carbonized, and the number of tons of sulphate he obtained.

Mr. Baker said the process he adopted was very simple. At present he drained through baskets, but the best way was to drain into a wooden tank lined with lead.

Mr. Church asked whether he used Newcastle coal.

Mr. Baker said the results he had given were those of the last four months, and during that time he had been using some Welsh coal, a little better than he obtained in former years; but generally he used Newcastle coal.

Mr. Craven asked whether he got 11,000 feet of gas out of Newcastle coal.

Mr. Baker said he did with Londonderry coal, No. 4 seam using high heats, and taking care that the dip was properly regulated, so as not to get undue pressure.

Mr. Stout said his works being now in process of rearrangement, he had not, during the last few months, the opportunity of carrying on the sulphate process as regularly as formerly. During the last entire year his production was rather over 30 tons of sulphate, and the quantity of coal carbonized something short 5,000 tons—say, 4,800. He charged his sulphate account with labor and carriage, and indeed every expense that legitimately belonged to it, and, on making up accounts at the end of the year, he found he had made a profit on the manufacture of £250.

Mr. Kelsall said there seemed some misconception respecting the strength of liquor which was preferable for the purpose of making sulphate. A chemical agent recently told him that he preferred 6° Twaddle liquor unscrubbed to 12° Twaddle scrubbed. As to the advantage of scrubbing gas, there could be no question in the minds of those who had had any experience in the matter. If Mr. Miles would go to the expense of erecting a scrubber he would find that the benefit in purification of his gas alone would repay the outlay.

Mr. Broadhead said at his works he did not manufacture sulphate, being under contract for five years for all his liquor. In his present contract he was bound to deliver it of 5 deg. Twaddle; formerly it was fixed at 4 deg., which was about the strength at which it left the hydraulic. By putting it through the scrubber it was brought up to 6 deg. and 6½ degs., and the purchasers did not mind how high it was raised.

[To be continued.]

Gas Matters in Paris During the Siege.

The report of the Paris Gas Company for the past year records the trials and losses endured by the company during the siege. At the date of their previous report France was at peace, with little suspicion of a coming war, and certainly no thought that Paris ever would be subjected to the horrors of a siege and bombardment. The council of administration were therefore jubilant on the subject of past success, and confident in the hope of increased prosperity in the coming year. These hopes. however, were blasted by the outbreak of the war, and from the commencement of the Prussian investment of the city the manufacture of gas was gradually diminished, until early in December it ceased altogether, except to keep the pipes full, and to supply balloons, and some other exigencies of the public service. At the date of the investment the

company had a larger supply of coal in store than usual, but still only sufficient for seven weeks normal consumption; great credit must, therefore, be given to the officials of the company for the skill with which they contrived to eke out this small quantity with a minimum of inconvenience to the public. In September the manufacture of gas was 16 per cent. less than in the same month of the previous year; in October it was 43 per cent. less, in November 63 per cent., and in December 95 per cent.

As regards the damage done to the several works in the course of the bombardment, we have some valuable details, which we must put on record here for the information of those who persist in believing in the danger of stores of gas. The governor of Paris entertained a notion of this sort, and thought the works at La Villette were dangerous to the fortifications in the vicinity. The company assured him that there was not the smallest risk. "If," they said, "a projectile made a hole in a gasholder, and set fire to gas, the gas would simply burn out as a jet of flame. The constant pressure of the gasholder would effectually prevent any access of air, and therefore there could be no such thing as an explosion." This happened exactly at Ivry. A shell pierced the gasholder and lighted the gas. There was a huge jet of fire for eight minutes, the holder slowly sank, and all was over. A more curious incident occurred at La Villette. There a shell penetrated a gasholder, *and burst in the interior without igniting the gas.* Nine fragments made their way out in different directions; but the servants of the company with great coolness and dexterity stopped the holes with plugs prepared for such an emergency, and so saved the greater part of the gas. At La Villette, also, a shell perforated the bell of a governor, and set fire to the gas; but there was no explosion. The fire was promptly extinguished, but the furniture in the office was destroyed by the explosion of the shell. At Vaugirard, where a great number of shells fell, only one penetrated a gasholder, and here again there was neither ignition nor explosion. These incidents, it is to be hoped, will set men's minds at rest for ever as to the supposed dangers of gasholders. The council, in their report, pay a well merited tribute to the courage and coolness of their officers and servants, who steadily carried on the operations of the company, and protected the works in the midst of such dangers. The men, it appears, were formed into special battalions, officered by nominees of the company, and they did duty alternately on the ramparts and in the works. Married men were retained on full pay all through the war, and the single had a liberal allowance. An ambulance, with thirty beds, was maintained at the expense of the company, and received 114 sick and wounded soldiers. Besides this the company contributed £1000 tc the general fund for the wounded. Lastly, we may notice the gift of a ton and a half of lead towards the defence of the city.

The accounts of the company, as we receive them, are not yet complete; but we may mention that instead of an increase of revenue of £64,000, which was calculated upon, the company suffered a decrease of £301,920 as compared with the preceding year. Some of this decrease, it is remarked, might have been made up by raising the price of coke; but, seeing that this article is the fuel of the poorer classes in Paris, the company, with a liberality which cannot be too highly commended, declined to add to the price.—*London Journal of Gas-Lighting.*

The Purification of Drinking Water.

Pure water is justly regarded as one of the most important subjects now attracting the attention of the public, and, as a consequence, inventors all over the country are devoting special attention to the construction of filters for effecting this object. The subject is a purely chemical one; and, as few of our inventors are chemists, it is not to be wondered at that a good deal of confusion exists in the public mind in regard to the subject. It should be remembered that the impurities that exist in water are of two kinds—those in solution and those that exist in a solid form. The former consist of various earthy salts and soluble organic matters; the latter may consist of earthy and sandy particles, the solid debris of animal and vegetable bodies, and living organisms from both the latter kingdoms. It is the solid matter alone that can be removed by the small filters in common use, in which the porous material consisits of paper, sponge, flannel, porous stone, sand, etc. Sand, if used in very large quantities, would remove soluble matter as well as that which is insoluble; but on the small scale it exerts an action that is merely mechanical.—*Technologist.*

To Remove the Crust of Carbon from Clay Retorts.—Take out plug from stand-pipe, put a pipe through lid of mouth-piece, or leave a space open at bottom of lid to allow a current of cool air to pass, which oxidizes and crumbles the carbon, which is renewed with the following charge. A bar is injurious.

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Eds.

New Gas Works at Elkhart, Ind.

Elkhart, Ind., August 28, 1871.

Mr. Editor: Supposing that every Gas-light Company in the United States subscribed for your valuable Journal, we thought we would not be behind our neighbors, so we send our subscription for it, to commence with the present volume.

Elkhart is situated on the Lake Shore and Michigan Southern Railroad, and about midway between Toledo and Chicago. Here the shops are located for doing all the repairs and manufacturing of engines along the road. The gas works were commenced on the 1st of May, and we lighted up the town on the 9d of August.

By the 1st of October we will have 100 consumers, 50 public lamps, and about 700 burners at the railroad shops, which I think is a very good start for our works, The works were put up by Mr. H. Stacey, Engineer of the Indianapolis Gas Company, and we think they are the model works of the State. The plan of the works show three buildings fronting on the street. The first is the office, 18 x 22 x 16 feet high, with a basement, which is used for a storeroom. In the office is placed the station meter, governor, and meter prover. Then comes a gate way 12 feet wide. Then comes the retort house, 28 x 28 x 18 feet high, within which are three benches of threes of clay, the lower retorts 12 x 20 and 9 feet. The building is covered with slate on a wrought iron truss frame, the ventilator covered with corrugated iron; then another gate way. The purifying house, which is 20 x 30 x 16 feet high, is also covered with slate. Inside are four purifiers, 6 x 9 x 2 feet 6 inches deep, with three tiers of lime trays, one boulder washer 4 x 9 x 8 feet high, with a partition in the center, making it a double washer; inside the washer there are iron bars placed like grate bars, and on them rest the boulders, which are thrown in carelessly to the depth of 18 inches; then a very fine spray is showered down on them from a pipe near the top, which is perforated with a number of small holes, and is supplied from a tank up in the roof, of sufficient capacity to furnish it 24 hours; there are three annular condensers, on the same principle as those at Indianapolis, and which are meeting with general favor, and are now being extensively used throughout the West, and also a six-inch dry center valve.

Next on the rear is the lime shed, then the boiler, and a Knowles steam pump for furnishing water for the works, also the gas fitting shop and coal sheds. The gasholder is 50 feet in diameter, 18 feet deep, and was erected by George Stacey & Co. of Cincinnati, who also furnished all the wrought and cast iron for the works, excepting the main pipe, which is from T. G. Gaylord & Co., and Robbins joint. The meters were furnished by the American Meter Company, of Philadelphia. The coal we use comes from Pittsburg, Pa. We have no exhauster, and we have made an average yield since the 1st of August of 4 26-100 cubic feet for each pound of coal. The retorts are from George C. Hicks & Co., Baltimore, Md.

Very respectfully,
Charles White,
Sup't Elkhart Gas-Light Co.

The Gas Wells of Pennsylvania.

Honorable Neal Dow communicating to the Boston *Congregationalist* gives the following account of natural gas wells:

In many parts of the Key Stone State, wells, bored for the purpose, yield an abundant flow of illuminating gas—identical in its character with that manufactured in our cities from bituminous coal. These wells are from 200 to 700 or 800 feet deep, and from three inches to five or six inches in diameter. They are "bored" through the various strata of earth and stone, and are lined, like oil wells, with wrought iron pipe made for the purpose. In many places these wells are of great value, affording sufficient fuel for driving the machinery of large manufacturing establishments, In some cases the supply of gas is sufficient to repay the entire cost of the well and fixtures in a single year or less.

At Erie, I saw several of these gas wells employed in this way. Directly on the shore of the lake are located the works for the supply of the city with water. The water is forced into a stand pipe, 230 feet high, by which it is distributed with sufficient pressure over the entire city. Two enormous engines do this work, being driven by steam generated by gas flowing from a well sunk upon the premises. We were permitted to look into the furnaces, which were all aglow with a brilliant flame, issuing from a series of small pipes connected with the gas well. There was no dust or nor smoke, and no fireman was required. The only attention necessary was to turn on or off a little gas according to the indications of the steam gauge. The works were about to enlarged, and another well was in progress, to furnish gas for the additional boilers.

These gas wells are found also in operation for domestic purposes; I saw it employed in a gentleman's house. In the library was an open fireplace, and a wood fire—or what seemed to be such—for the terra cotta upon the andirons was in admirable imitation of hickory wood. A low fire was burning, for the morning was not cold: the lady of the house turned a small tap near the fireplace, and the flame instantly increased in volume, and continued to increase, as the gas was turned on, until the fireplace was full of flame, issuing from the terra cotta, and we had what seemed to be a roaring hickory wood fire,

The gas was then slowly turned off, and the fire gradually diminished and finally expired. The lady then with a match lighted a piece of paper and threw it upon the wood, turning on the gas at the same moment, and we had instantly the low fire which we found at the beginning. In every room in the house, except the kitchen, was a similar apparatus, and fires could at any moment be lighted with as much facility as the chandeliers in the same apartments, supplied with gas from the same well.

In the kitchen was a large and complete range. sufficient for a family of thirty persons. When we entered a low fire was burning, and sundry vessels were simmering over the flame. The cook turned a tap, and instantly the range was filled with a fire sufficient for all culinary operations up to the full capacity of the apparatus. Nothing is employed in that house for heating and illumination, except this gas.

The well is in the back yard, sufficiently removed from the mansion, and is covered by a small house. The bore is 520 feet deep, lined with iron pipe, and furnished with a safety valve, like that of a steam boiler, and the gas is brought into the house and conducted over it, in the same mode employed in the case of ordinary street gas or water. The entire cost of this well and the fixtures, ready for use, was $2,500, and the supply of gas was sufficient, I thought, for two or three other first class houses. Nothing can possibly be more perfect than this arrangement; the fuel supply being as convenient and abundant as that of water and illuminating gas from the public works. —*Scientific American.*

Wollongongite.

This mineral, which was discovered in the year 1865, by Mr. C. Mitchell, at Megalon, near the Western Railway of New South Wales, occurs in cubical blocks without lamination, breaks in broad conchoidal surfaces, is extremely tough, and resounds like wood under the blows of the hammer; its hardness is from 2 to 2.5, and its specific gravity from 1.04 to 1.49; it has a resinous, somewhat silky lustre, and is of a greenish-black or brownish-black color; the streak is light brown to yellowish; it gives no odor when rasped, is tasteless, and easily cut, the thin shavings curling up under the knife; it is not electric by friction of the mass, but the chips cut off by the knife are highly electric; it is translucent in thin shavings, and under the microscope transmits amber yellow light; alone in the test-tube it does not melt, but decrepitates and distills a copious flow of oil of a yellow color and strong odor, giving off much gas; it is insoluble in alcohol, ether, or benzole, but is slightly dissolved in carbonic disulphide, to which it imparts a slightly yellowish tinge; it is readily kindled in thin splints by a match, burning with a brilliant flame and much smoke. Comparing the Wollongongite with the Torbane mineral, the commercial advantages appear to be decidedly in favor of the former; for, whilst the Torbane mineral yields 14,000 cubic feet of gas to the ton, of a power equal to about 15 candles, the Wollongongite yields 14,716 cubic feet, having an illuminating power equal to 26.54 candles; and, whilst the Torbane mineral contains but 70 per cent. of volatile matters, 10 per cent. of fixed carbon, and 20 per cent. of ash, the Wollongongite contains 82.5 per cent. of volatile matters, 6.5 per cent. of fixed carbon, and only 11 per cent. of ash. The shale accompanying the Wollongongite is a valuable oil shale, yielding about 60 gallons of crude oil to the ton, so that the entire district promises to become of high commercial value.—*Technologist.*

[See Prof. Silliman's discussion of this mineral, communicated to us as long ago as Sept. 2, 1869 (Repertory of that date p. 67). Prof. S. gave it the name *Wollongongite.* We understand that it has been used in San Francisco and elsewhere, for gas enrichment.—Ed.]

CORNELIUS & SONS,

MANUFACTURERS OF

GAS FIXTURES, LAMPS, &c.

WHOLESALE AND RETAIL SALESROOMS,

No. 821 Cherry Street,

PHILADELPHIA.

☞ We have no Store or Salesrooms on Chestnut Street.

Dust Fuel.

[Dr. James D. Whelpley, in *Van Nostrand* for July, gives us some account of the results of the use of this invention, as perfected by himself and associates. (See our issue of June 2d, first page.]

In the furnaces constructed and used by Messrs. Whelpley & Storer, for burning pulverized carbon, carried by an air blast into the furnace, the intensities of heat generated by the blow-pipe flame, have been limited only by the fusibility of the brick work composing the sides and cover of the furnace. It is probable that in a small fire-box composed of less fusible material, let it be for example quick-lime, temperatures may be obtained by the burning of carbon dust in conjunction with a highly heated blast of atmospheric air or of oxygen which will fuse, not only platinum but the purer kinds of silicious minerals.

The mechanism for the pulverization of the coal employed in this process is to the general public and the engineering profession a very novel invention, although it has been in practical use in New England since 1863. A small iron drum or cylinder about 12 inches interior diameter and length, carries internally a steel axis furnished with paddles of soft steel, which move at the extremities of wrought iron arms without friction against the interior of the drum, at the rate of 10,000 per minute. Small coal, bituminous slack, is fed automatically into the side of the drum about the shaft, and being reduced to dust by the violent rotatory action of the paddles, is drawn out by a small exhaust fan.

A SAVANT has discovered with the microscope that when we pour milk into a cup of tea the albumen of the milk and the tannin of the tea instantly unite and form leather, or minute flakes of the very same compound which is produced in the texture of tanned hides, and which makes it leather as distinguished from the original skin. He consequently estimates that in the course of a year a tea drinker of average capacity imbibes enough leather to make a pair of shoes.—*Amer. Artisan.*

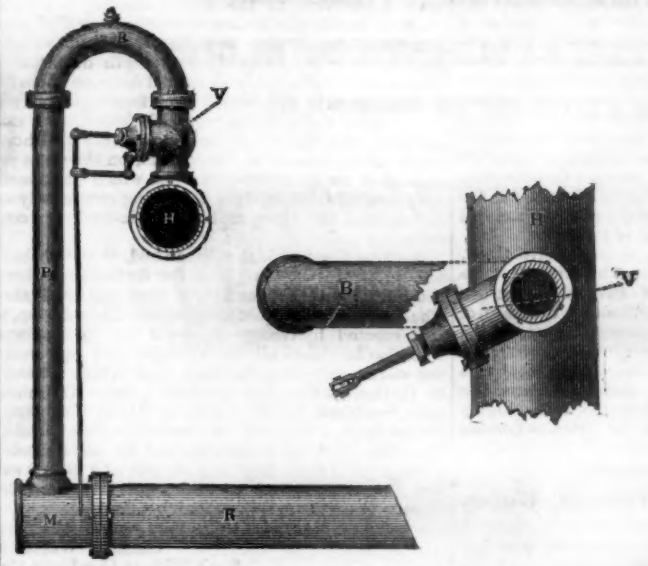
[Our own chemical teaching was that leather is composed of gelatine (not albumen) and tannin. Nevertheless, we live and learn. Probably the genius who wrote the above may now be persuaded to tell us how to convert hen's eggs into leather. When eggs are cheap, might we not make boot heels of them.—Ed.]

RATIONAL VALUATION OF THE ACCESSORY PRODUCTS OF GAS MANUFACTURE.—Prof. A. Wagner —From the *Bayerisches Industrie und Gewerbeblatt.* The Prof. suggests the fractioning of the coal tar while the process of gas-making is taking place. The hydraulic main is usually heated to a point not far from the boiling point of water, which will allow the coal tar naphtha vapors to escape, to be condensed in the condenser and scrubber. If this product were secured it would need comparatively less distillation to get from it pure benzole than from the coal tar. Much of the ammonia also escapes from the hydraulic main on account of the heat of that portion of the apparatus, two-thirds indeed being proved by actual analysis to have gone into the liquors from the scrubber and condenser.

The American Coal Gas-Light Improvement Co.

ARE THE SOLE OWNERS OF THE

GIBSON IMPROVEMENT



In the manufacture of Coal Gas by means of which Dip-Pipes are dispensed with, the deposit of Carbon in the Retorts prevented, and a very large saving is effected.

Licenses for its use will be granted; also the parts necessary will be supplied to order, on application at their office,

No. 79 Water street, Boston, or

No. 41 Pine street, Room 1 New York.

R Retort.

M Mouth-piece.

P Stand-pipe.

B Bridge-pipe.

H Hydraulic main.

V Valve-substitute for Dip-pipe.

RECENT AMERICAN PATENTS.

Pertaining to the Specialties of this Journal, for the three weeks ending Aug. 25, 1871.

117,366.—Meter.—W. Ball, New Vienna, Ohio.
117,601.—Gas Pipe Seal.—H. B. Chapman, Waltham, Mass.
117,670.—Gas Retort.—D. Davidson, New York City.
117,631.—Gas Retort.—S. Holman, London, England.
117,645.—Gas.—F. King, Washington, D. C.
117,965.—Water Meter.—J. Broughton, Brooklyn, N. Y.
118,028.—Gas Engine.—C. P. Leavitt, New York City.
118,112.—Meter.—D. P. Davis, Jersey City, N. J.

SITUATION WANTED, as Superintendent or Assistant Superintendent of Gas Works, by a person of long experience as Gas Engineer. Best references will be given. Address THOMAS FIELD, No. 2230 Coates Street, Philadelphia. 249-3t*

J. H. TENNENT & CO.,

MANUFACTURERS AND DEALERS IN ALL KINDS OF

Oils, Lamp Goods & Matches,

HEADQUARTERS FOR THE PATENT

Fire Proof Mica Lamp Chimney.

226 Pearl Street, N. Y. 246-3m

JOURNAL OF THE FRANKLIN INSTITUTE.

EDITOR—PROF. W. H. WAHL, PH.D.
ASSISTED BY THE COMMITTEE ON PUBLICATIONS.

This Journal, devoted to Mechanical and Physical Science, Civil Engineering, and the Arts and Manufactures, published in monthly numbers of seventy-two pages each, forming two volumes per annum, illustrated with engravings and woodcuts.

The Journal is now in its forty-fifth year of publication, and has become a standard work of reference.

TERMS OF SUBSCRIPTION.—Five dollars per annum; payable on the issue of the sixth number. When the full subscription (five dollars) is paid in advance, the numbers will be sent *free of postage*

Communications and letters on business must be directed to the ACTUARY OF THE FRANKLIN INSTITUTE, PHILADELPHIA

WILLIAM FARMER,

ARCHITECT AND GENERAL GAS ENGINEER,

111 BROADWAY, TRINITY BUILDING, Room 91, New York.

WILLIAM FARMER may be consulted upon all matters connected with the construction of GAS WORKS and other buildings. Will furnish General and Detail Drawings, Specifications and Estimates for Gas Works of any capacity, Retort Settings, Condensers, Washers, Exhausters, Purifiers, Holders, Coal Hoisting Apparatus, Iron Roofs, and every description of Machinery required in the Manufacturing of Gas.

PATENTEE OF THE FOLLOWING INVENTIONS:

Exhausters for Gas and Foul Lime Ventilation,
Dumping Barrows for Coal, Coke and Lime,
Blowers for Forgers,
Pumps for Water, &c., &c.

REFERENCES:

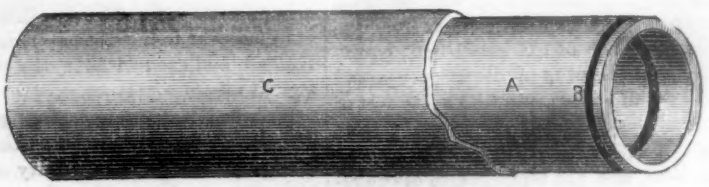
CHAS. ROOME, President Manhattan Gas-Light Company, N. Y.
SAMUEL DOWN, President American Meter Company, N. Y.
C. VANDERVOORT SMITH, Engineer Manhattan Gas-Light Company, N. Y.
CHARLES MOWTON, Engineer New York Gas-Light Company, N. Y.
SAMUEL P. PARHAM, Engineer Mutual Gas-Light Company, N. Y.
Prof. HENRY WURTZ, Editor Chemical Department GAS-LIGHT JOURNAL.
HENRY J. DAVISON, Engineer, 77 Liberty Street, N. Y.
HERRING & FLOYD, Oregon Iron Foundry, 738 Greenwich Street, N. Y.
FREDERICK SABBATON, Engineer Troy Gas-Light Company, Troy, N. Y.
Col. WHITE, Engineer People's Gas-Light Company, Williamsburgh, N. Y.
GEORGE W. PARSONS, Sup't and Eng'r. Rochester Gas-Light Co., Rochester, N. Y.
GEORGE W. EDGE, Engineer, Jersey City Gas-Light Co., Jersey City, N. J.
J. H. GAUTIER & Co., Fire Brick Works, Jersey City, N. J.
Professor SILLIMAN, New Haven, Conn.
JOHN HARRISON, Engineer People's Gas-Light Company, Baltimore, Md.
CHARLES FABEN, Superintendent and Engineer Toledo Gas-Light Co., Toledo, O.
PETER F. BURTIS, Supt. and Engineer, Chicago Gas-Light Co., Chicago, Ill.
JAMES R. SMEDBERG, Consulting Engineer, San Francisco Gas-Light Co., Cal. [257-1

NORTHWESTERN
GAS AND WATER PIPE COMPANY.

WORKS AT BAY CITY, MICHIGAN.

CHICAGO OFFICE, 41 REYNOLDS BLOCK.

SECTION OF GAS PIPE.



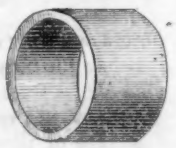


FIG. 2.

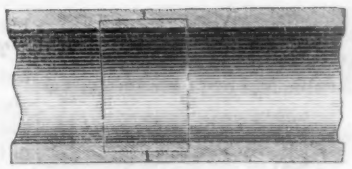


FIG. 3.

A—Cylinder of Wood. **B**—Band of Iron. **C**—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3.—Horizontal Section and Connection.

Above is a cut of the

"WYCKOFF PATENT IMPERISHABLE GAS PIPE,"

manufactured by the NORTHWESTERN GAS AND WATER PIPE COMPANY.

This Pipe is made of White Pine, one inch to twelve inches bore, in sections eight feet long, rounded in a lathe, coated inside and out with Asphaltum, connected with a tenor, or socket, and a thimble joint, perfectly air and water tight, being driven together with cement furnished by the Company. When laid its cost is about one half that of Iron Pipe, and is UNQUESTIONABLY the best Gas conducting Main in use.

☞ **Send for Descriptive Pamphlet and Price List.** 242-1y

LUDLOW

Valve Manufacturing Co.

OFFICE 193 RIVER STREET, TROY, N. Y.

Make Valves—Double and Single Gate—¼ inch to 36 inch, for Water, Gas and Steam.

"CINCINNATI, March, 1870.

"I would say that if any certificate or affidavit is desired in relation to the superior character of the Ludlow Valve above others that I have seen, the same will be cheerfully given. I think, however, that the Valve proves for itself.

"JOSEPH MAYER,
"Superintendent Water Works.',

"DAYTON, OHIO, June 27, 1870.

"I have to say that we find them always in order—operating easily under all degrees of pressure. In a words they have given perfect satisfaction in every particular.

"GEORGE LEHMAN,
"Chairman Water Works Committee.'

"CANTON, OHIO, June 27, 1870.

"We are now using and have been, since the commencement of our works, your valves, and they are proving entirely satisfactory.

"JOHN S. SHORE,
"Superintendent Water Works."

"PEORIA WATER WORKS, July 1870.

"With pleasure I can testify to their superiority. Their action has been perfect under all degrees of pressure, and have given perfect satisfaction.

"S. A. KINSEY, Ex. Sup't.
"JOHN J. STEIGER, Sup't."

"BROOKLYN GAS LIGHT COMPANY.

"I take great pleasure in saying that they give perfect satisfaction—opening easily and quickly, and requiring no effort to start them; even after they have been closed for months.

"A. F. HAVENS, Engineer."

"OFFICE OF PHILADELPHIA GAS WORKS, 14th June, 1870.

"I am pleased to state that the lot of large Gas Valves bought from you (Hart & Buck), as agents of the Ludlow Manufacturing Co., have given me perfect satisfaction. The double gate water valve, bought for a special purpose, also works admirably. We want no better valves. The Indicator on your valves is a great improvement over the old style.

"THOS. R. BROWN, Engineer."

SITUATION WANTED.

AS MANAGER OF GAS WORKS IN THE WEST OR South, by a thorough practical man, of fifteen years experience, in building and managing Gas Works. Is fully acquainted with *all* branches of the business; setting retorts, laying mains, etc., including gas fitting. Has been bookkeeper for several years with a large Gas Company, and would be willing to combine the position of Secretary and Manager for any small Works, at a moderate salary. Best of references given as to character and capacity. Address S. S. S., Spurrier House, Louisville, Ky. 247-tf

Six Inch Pipe for Sale.

A FEW THOUSAND FEET OF SIX INCH CAST IRON Pipe for Gas and Water. Delivery in August, September and October. P. O. BOX, 3399.

CHARLES FLEURY,
247-tf 76 Water Street, New York.

THE AMERICAN

GAS-LIGHT JOURNAL

AND

Chemical Repertory,

PUBLISHED ON THE 2D AND 16TH OF EACH MONTH,

At No. 42 Pine Street, New York.

A. M. CALLENDER & CO.,
PROPRIETORS.

EDITOR---PROF. HENRY WURTZ.
Editor's Private Office, 26 Pine St., Room 36.

This is a recognized official organ of—

LIGHT, HEAT, MINING INTERESTS, STEAM, WATER-SUPPLY, PATENTED INVENTIONS, VENTILATION, SANITARY IMPOVEMENT, AND GENERAL CHEMICAL SCIENCE.

TERMS:

SUBSCRIPTION—Three D llars per annum, in advance.

AGENTS:

NEW YORK—AMERICAN NEWS COMPANY, 119 and 121 Nassau St
BOSTON—S. M. PETTENGILL & Co., 6 State Street.
PHILADELPHIA—COE, WETHERILL & Co., Ledger Buildings, Phila.
Germany—B. WESTERMANN & Co., of New York.
Great Britain—TRUBNER & Co., 60 Paternoster Row, London.
France—LE JOURNAL DE L'ECLAIRAGE AU GAZ, 25 Boulevard Poissonniere.
Brussels, Belgium—HENRI BERGE.

☞ All communications to be addressed to "THE EDITOR, No. 42 Pine Street, Room 18, New York.

SATURDAY, SEPTEMBER 2, 1871.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York agents for this Journal. News dealers will please send orders to them.

NOTICE.

☞ *All Collections for Advertisements, Subscriptions, etc., are made directly from this Office. We have Agents to solicit the same, but they are not authorized to Receipt for Money.*

TO OUR SUBSCRIBERS AND PATRONS.

In making remittances for subscriptions, always procure a draft on New York, or a POST OFFICE MONEY ORDER, if possible. Where neither of these can be procured, send the money, but always in a REGISTERED LETTER, The registration fee has been reduced to fifteen cents, and the registration system has been found by the postal authorities to be virtually an absolute protection against losses by mail. ALL Postmasters are obliged to register letters whenever requested to po so.

CONTENTS.

☞ An asterisk (*) denotes an illustrated article.

J. G. Knapp & Co's Steel Diaphragm Gasfitter Test Guage. 65
Chemical Excerpts..... 66
Suggestions Upon the Nature of Heat..... 96
Report on the Rock Oil, or Petroleum, in Venango C.o, Pa. 68
British Association of Gas Managers..... 68
Gas Matters in Paris during the Siege..... 68
The Purification of Drinking Water..... 69
CORRESPONDENCE.—
New Gas Works at Elkhart, Ind..... 69
The Gas Wells of Pennsylvania..... 69
Wollongongite..... 69
Dust Fuel..... 70
Recent American Patents..... 70
EDITORIALS—
The Abolition of the Hydraulic Seal..... 72
Prof. Silliman's Original Report on the Pennsylvania Petroleum..... 63
The New York Mutual Gas-Light Co..... 73
The American Institute Fair..... 73
A Report from the London Gas Referees on Burners. 73
The National Oil Journal..... 73
Gas Fixtures, Lamps, etc..... 73

General Editorials.

THE ABOLITION OF THE HYDRAULIC SEAL.

In the last issue, we commenced a discussion of this now mooted subject, with some interesting extracts from the Proceedings of the British Association of Gas Managers relating thereto. We now follow up with some facts that we have gathered concerning the important experiments which have been and are now in progress in this country.

Within the last two years, through the efforts of a few gentlemen, who associated themselves together under the name of the AMERICAN COAL GAS-LIGHT IMPROVEMENT COMPANY, considerable attention has been drawn to the subject by Gas Engineers and Managers in America. This company has not only presented what is claimed as a feasible plan for accomplishing the object, but they have brought it into use in several gas works in different parts of the country.

At the Cambridge gas works, we are told that these retort valves were first applied successfully, to take the place of dip-pipes; and numerous trials have, from time to time, been made there, with benches of five clay retorts, both *with* and *without* dip-pipes, in order to determine, by comparison, the advantages of the latter over the former.

At these works we learn that the plan of construction of all the benches is the same. The exhauster is of the SMITH & SAYRE pattern, and is run uniformly so as nearly to remove all pressure from the hydraulic main. In those benches where the retorts are connected with dip-pipes, these pipes enter half an inch below the surface of the liquid in the main.

According to records, kindly placed at our service, of early trials of Mr. Wm. Gibson, he obtained from a ton (2000 lbs.) of Westmoreland coal, with which the former retorts were charged, 8.736 cubic feet of 16 candle gas, and from the latter 10.976 cubic feet of 16.5 candle gas, equivalent to 4.99 cubic feet of 14 candle gas, per pound of coal, with the dip-pipes, and 6.46 cubic feet of 14 candle gas per pound of coal, from retorts with valves and without dip-pipes. The quality of the coal used, and the temperature of the retorts and other conditions were, as nearly as could be determined, alike in both cases.

A ton of Caledonia coal, under like circumstances, produced in the retorts connected with dip-pipes 7,300 cubic feet of 14 candle gas, equal to 3·65 cubic feet per pound, and in those without dip-pipes 8,800 cubic feet of 14.75 candle gas, equivalent to 4.63 cubic feet of 14 candle gas per pound.

These trials were made on alternate days occupying two weeks, one half of the retorts with dip-pipes, and the other half with valves, and all connected with the same hydraulic main.

More recent trials are also reported to us, on the authority of, and made by, Mr. Edward Jones, Engineer of the South Boston Gas Works, assisted by Mr. Alfred W. Norton, of the East Boston Gas Works, and Mr. Thomas J. Pishon, of the Roxbury Gas Works, Boston Highlands district. These were conducted at the same works and occupied several days, during some part of which time several managers and engineers of gas works, from various parts of the country, were present.

During a part of these trials the reading of the station meter was taken, and the quality of the gas made photometrically determined, every half hour. The number of tests therefore of its illuminating power was about seventy for the gas from a four hour charge of coal. The charges varied in the different trials made, from 700 pounds to 1000 pounds to each bench of five retorts.

The coal used, in all the trials made, was taken from the same heap, and carefully weighed, and the heat of the retorts was as nearly the same as could be determined by the eye, without the use of the pyrometer. In the photometric trials the comparison was between a Sugg-Argand burner with 16 holes, and the standard candle burning at the rate of 120 grains per hour, and the computation was made in the usual manner.

The average result all of these trials reduced to 14 candle gas was as follows:

With Dip-Pipes.	With Retort Valves.
Cub. ft. per pound of coal.	Cub. ft. per pound of coal.
5.13	6.28

A full report of the trials in detail, would occupy too much space for the columns of the Journal at present.

Similar results are stated to have been obtained from other trials at the Cambridge works.

At other works where the plan has been introduced, and where there has been no exhauster or photometer, of course exact observations could not be made. In every instance, however, those who have had the management of such works have reported that there was an increase in the quantity of the gas produced from the coal carbonized, and that the retorts were kept *free from the carbonaceous deposit* which had previously accumulated in them.

The fact that, where the retorts are arranged on this plan, carbon does not accumulate in them, is alone deemed sufficient to show that a great saving is effected, and that such *must* be the case, inasmuch as the deposited carbon is derived from the illuminants, all of which are readily decomposed by the joint influence of *time* and *temperature*, and their elements converted into solid carbon and light carburetted hydrogen. By the use of retort valves in place of dip-pipe seals, in connection with the exhauster, this decomposition would appear to have been almost, if not entirely avoided, and even without the exhauster it is in a great measure prevented.

With benches of retorts arranged on this plan, it is stated to be optional with the gas engineer to largely increase the quantity of gas produced from the pound of coal, without diminishing its quality, or to greatly increase its illuminating power, simply by regulating the weight of the retort charges. By it he may produce gas of good quality, comparatively, from poor coals, if necessitated to use them.

The promoters are fully convinced that it will not be long before the universal opinion of gas engineers will confirm their opinion, that this is the most important and valuable improvement in the manufacture of illuminating gas, which has been made since Mr. Murdock lighted the cotton mills of Phillips & Lee of Salford, England, in 1805. Of course we do not refer to the great progress which has been made, since that time, in the kind of retorts used, and the modes of setting them, or to the methods which have been contrived to render the product suitable for lighting apartments.

In large works its adoption should then enable Gas-Light Companies to increase considerably their dividends, or lessen the cost of gas to their consumers, and in small works, owned by Gas-Light Companies who are barely able to meet their expenses, it will enable them to pay dividends, and at once give a market value to their shares.

We shall shortly, as before announced, have much new matter to lay before our readers, on this important topic.

PROF. SILLIMAN'S ORIGINAL REPORT ON THE PENNSYLVANIA PETROLEUM.

Observing that our friends of the *American Chemist*, have wisely obtained permission from Prof. Silliman to put on permanent record his remarkable original report upon this product, which was so greatly instrumental in giving the first impulse to the explorations that have led to such stupendous results, we have sought the same permission, believing that our reflective readers will be gratified thereby. We should like to dilate on this topic, but can only point out how surprisingly Prof. S., in this first investigation of the subject, anticipated and exhausted almost every available point of practical application and manipulation that has been since brought out by others. It will be observed that his data are especially exhaustive on the subject of the distillation, rectification and separation of the various qualities of distilled products, and that he even discovered the phenomenon which is even yet imperfectly worked out by chemists, of the gradual conversion of the heavier oils into lighter at temperatures below their boiling points, a principle of which most extensive practical use is made. He pointed out the *isomerism* of the various products. His photometric experiments and devices were most important, and far in advance of the time. He converted the oil into gas, by methods approaching closely to those now in use, and was doubtless the first to accomplish this. He proposed the making of the paraffine (*ozocerite*) into candles, now such an extensive business. He pointed out distinctly the peculiarity of this Pennsylvania oil, of not thickening on exposure to a tar or pitch, like most others. His theoretical and genetic suggestions (third paragraph) cover concisely nearly the whole range of the vast discussion that has since arisen. Many other curious remarks might be made, had we space.

THE NEW YORK MUTUAL GAS LIGHT COMPANY.

In the issue of July 3d we promised a visit to the new works of this new Company on the East River, at 11th Street, and an account thereof, for the information and behoof of our readers. The visit we have made, but the space for the aforesaid account has been lacking. This is to be the less regretted, as we have reason to expect that we shall soon have at our command some fine pictorial illustrations of these works, and parts thereof.

In addition to the ground occupied at first by the Mutual, they have also purchased the adjoining site of the old Novelty Works, the buildings of which we found in course of active demolition, to make room for additional holders. A marked characteristic of this new enterprise has been a degree of diligence and dispatch which is remarkable, even in Mr. Kennedy (the builder). The solidity and beauty of the work in every part, notwithstanding the unexampled rapidity of its completion, will strike every eye. In the meantime, we advise all interested to visit these works themselves, sure that every courtesy will be experienced from the gentlemany engineer, Mr. Perham.

THE AMERICAN INSTITUTE FAIR.

The Fortieth Annual Exhibition of the American Institute, will be opened in the Empire Rink at Third avenue and 63rd street, on Thursday, September 7th, at 12 M. The exhibition will continue every secular day from 9 A. M. to 10 P. M. for two months, and will close with an address and the proclamation of awards. The Board feel confident that this exposition of American industry can be made to surpass any that has preceded it. They propose several novelties, and particularly desire that this shall be an exhibition of advanced methods and processes. They are especially anxious to have the operators seen at work with their machinery upon the raw or half finished material, for the pleasure and instruction of visitors. Several manufacturers have already indicated a disposition to exhibit, on a small scale, in the manner indicated.

In response to the request of many leading manufacturers and exhibitors, and to its own convictions, the Institute has decided to present no medal to exhibitors hereafter, except the great Medal of Honor, which can only be awarded to the discoverer or inventor of a machine, product, or process so important in its use or application, as to supplant any article previously used for the same purpose, or at least to work a revolution in some branch of the useful arts.

A REPORT FROM THE LONDON GAS REFEREES, ON BURNERS.—Through the kindness of Prof'r Silliman, we have a copy of this report, which is very elaborate, exhaustive and instructive. It is a subject of regret to us that we cannot even crowd in the briefest digest at present. We shall only say now that one of the subjects investigated has been the relation of illuminating power to consumption, with the result that they do not find either the rule of Bunsen or that of Farmer confirmed by their experiments, and announce that *with appropriate burners*, the rule ordinarily accepted, of light production precisely in proportion to consumption, is fully verified. They say that the "Farmer theorem appears to have been accepted in America." We beg to disavow this, so far as this Journal is concerned. We have not, at any time, given in our adhesion to this hypothesis, as a thing established by experiment.

THE NATIONAL OIL JOURNAL.—A copy of this Journal, lately started at Pittsburgh, Pa., by G. E. Palmer & Co., has been received by us. It is devoted especially to the great and increasing oil interests, and we have no hesitation in saying it must command that support it so eminently deserves. From the many kind words it has received at the hands of the fraternity, we may conclude that it has met with a favorable reception; we therefore wish it every success.

GAS FIXTURES, LAMPS, ETC.—We take pleasure in calling the attention of our readers to the advertisement of Messrs. Cornelius & Sons, 821 Cherry street, Philadelphia, where can be found a large and varied assortment of gas fixtures, lamps, etc., of the latest designs. Parties desirous of purchasing would do well to pay them a visit.

JOHN KEELING,

GAS ENGINEER,

May be consulted on all matters connected with the Construction, Alteration, or Extension of Gas Works, having had extensive experience in some of the best Gas-making Establishments in England.

KEELING'S

Patent Gas Governor and Pressure Indicator.

Saves the Companies two men's labor. It also saves the Gas Consumer from 25 to 40 per cent. Send for Circular.

Address 43 Pine Street, office of this Journal. 249

OFFICE OF

THE GAS-LIGHT CO. OF AMERICA.

C. K. GARRISON, President.
E, W. McGINNIS, Secretary and Treasurer.
JOHN P. KENNEDY, Chief Engineer.
LEONARD D. GALE, Consulting Chemist.

GENTLEMEN: We beg leave to inform you, that we have purchased the Patent process for making ILLUMINATING GAS from PETROLEUM and its products, known as the

GALE and Rand Patents,

and we are now prepared to treat with you for the use of said process by your Company.

We are also prepared to contract for putting said process into successful operation in your works, furnishing all the necessary plans, materials, and workmen for that purpose.

We do not deem it necessary to enter upon a detailed description, here, of the processes above referred to, deeming it sufficient to state, to secure your interest and investigation, that they have been in successful operation, for months, in a number of Gas-Light Works in the United States, and are now being introduced in the works of the Mutual Gas-Light Company, of New York City; the Citizens' Gas-Light Company, of Brooklyn; the New Orleans, San Francisco, and very many other Gas-Light Companies throughout the country.

For full particulars, address

THE GAS-LIGHT CO. OF AMERICA.

248-tf] **P. O. Box 5220, New York City.**

THE AMERICAN

GAS SCREEN MANUF'G COMP'Y.

LETTERS OF INTEREST TO GAS LIGHT COMPANIES and Superintendents of Gas Works needing new Gas Trays, or Screens, for another season.

Which are the best and cheapest?

We refer to over sixty companies *now* using them.

BROOKLINE, June 17, 1871.

E. DUFFEE, ESQ.:

Dear Sir: You will please make a set of Gas Trays for this Company as soon as convenient, at price named.

In regard to the merits of the Tray, after having them in constant use for over two years, I will say that I consider them *superior to any Tray* manufactured in this country.

Respectfully Yours,
H. A. ALLYN,
Superintendent Brookline Gas-Light Co.

EAST BOSTON, June 15, 1871.

Gentlemen: We have used your Screens some five years they give perfect satisfaction.

I consider them *by far the best Screen* for Dry Lime Purifiers I have seen.

Yours truly,
A. M. NORTON,
Supt. East Boston Gas-Light Co.

CHELSEA, May 1, 1871.

MR. E. DUFFEE:

We are using your Purifying Trays, and find them to be the *best of any* that I have used, and will *purify more gas with less pressure* than any tray that I know. I can fully recommend them, after four years trial, to any Gas Superintendent with perfect safety, as the *cheapest and best Tray made.*

Yours truly,
JOHN ANDREW, Supt.

JAMAICA PLAINS, MASS., June 21, 1871.

EDWARD DUFFEE, ESQ:

Dear Sir: The Trays ordered by this Company three years ago, are getting somewhat worn. I wish to say here that I consider your Trays to be superior to any yet invented, therefore please make us another set at the price named, to be like the sample shown in every way, and oblige. Yours truly,
JAMES F. ROGERS,
Supt. Jamaica Plains Gas-Light Co.

Also see letter from Providence, R. I., in another column.

It will be for the interest of all Gas-Light Companies needing new Trays another season, to give their orders early, to be delivered where wanted, as we were unable to fill orders promptly to Companies ordering late last fall.

American Gas Screen Man'f'g Company.
Haverhill, Mass. 246-3m

TO DEALERS IN

GAS FIXTURES& GAS STOVES,

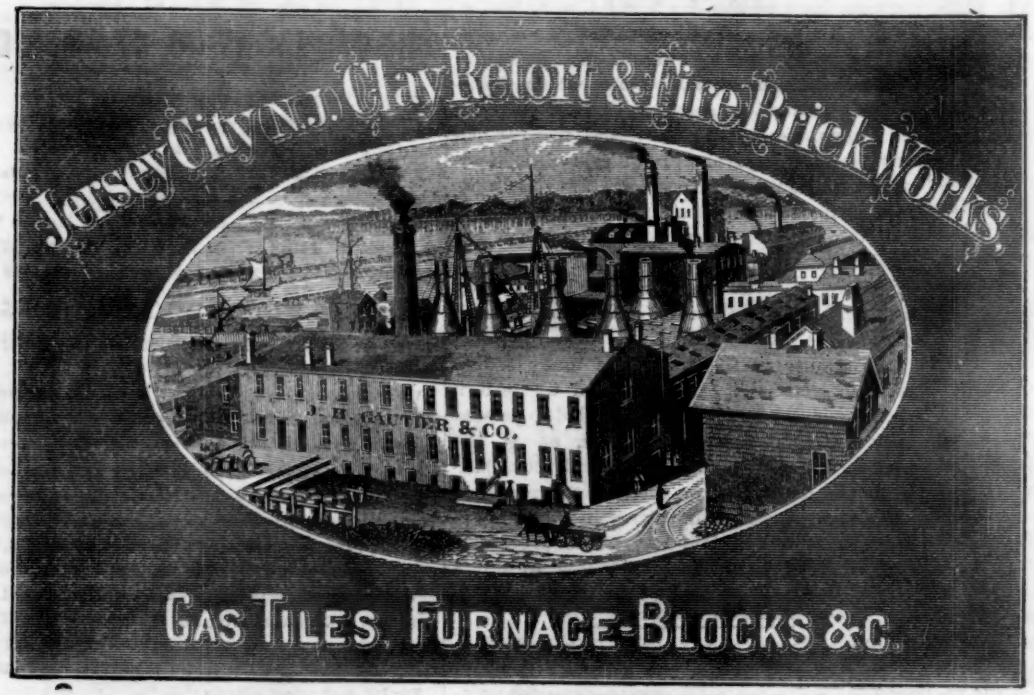
ESPECIALLY IN THE SOUTHERN STATES.

State Licenses for the manufacture and sale of the celebrated "CAMBRIDGE GAS STOVES," together with complete sets of patterns for the castings of the same, can be had by responsible parties on favorable terms, by applying to the undersigned. Orders for the above stoves, made up and ready for use will be promptly filled.

In the CAMBRIDGE GAS STOVES, as in ordinary coal stoves, the products of combustion are passed by pipes out of the room.

Descriptive circulars and testimonials will be sent on application to

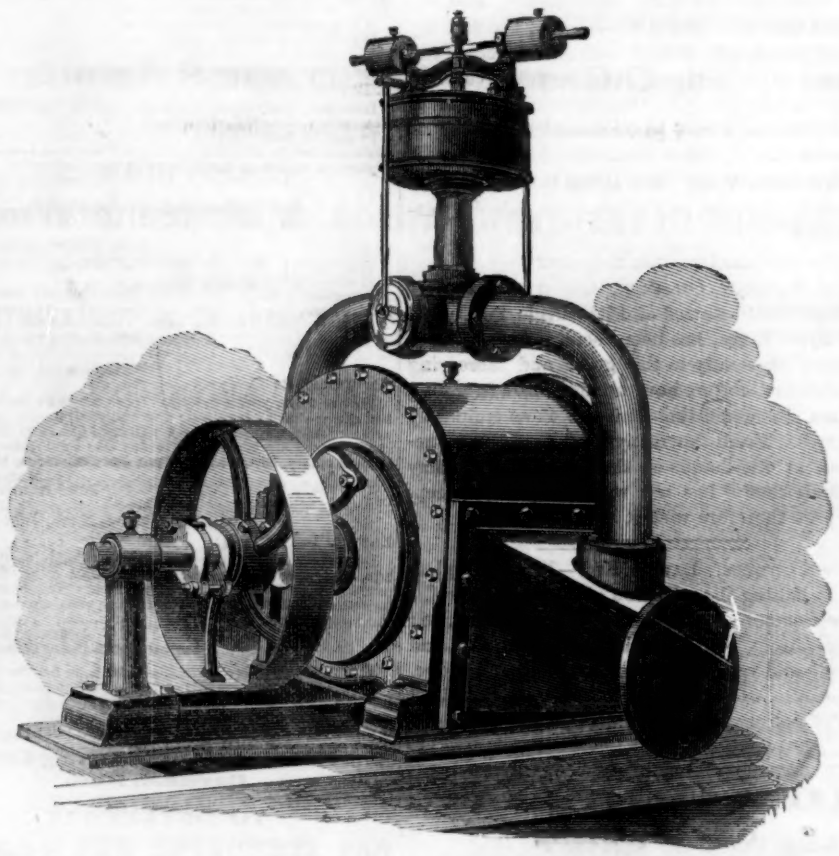
LINCOLN & ALLEN,
Manufacturers of the Cambridge Gas Stoves,
249-tf. No. 59 Blackstone Street, Boston, Mass.



SMITH & SAYRE MANUFACTURING COMPANY.

The Mackenzie Patent Gas Exhauster

And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its ation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the rdinary Fan. The Cupolas are manufactured in sizes to melt from 1 to 20 tons per hour, will save one quarter of the time equired by the old style Cupola, and 33 per cent fuel. Address

B. KREISCHER, President.

CHARLES W. ISBELL, Secretary. JAMES SAYRE, Treasurer.

OFFICE, 56 LIBERTY STREET, New York.

GRAHAM'S

Patent Anti-Freezing LAMP POST.

THE BEST, CHEAPEST AND MOST DURABLE POST EVER OFFERED TO THE PUBLIC.

WOOSTER, OHIO
Jan. 24, 1871.

J. W. GRAHAM,

Dear Sir: Yours of the 14th inst at hand. In reply I would say that we have tested the six anti-freezing Lamp Posts purchased from you, and find them to be all as you represented. Whilst nearly a dozen of our sixty-five Posts were frozen down last month and first of this not one of yours was affected by the heavy frost. What can you sell them at?

Yours truly,
LUCAS FLATTERY,
Sec'y Wooster Gas-Light Co.

Address the Patentee,

J. W. GRAHAM,
Chillicothe, Ohio.

250-9t

AGENCY FOR

GIBSON'S IMPROVEMENT

IN THE

Manufacture of Coal Gas,

41 PINE STREET, ROOM 1.

The undersigned having been appointed Special Agent for the introduction of GIBSON'S Substitute for Dip-Pipes in the Manufacture of Coal Gas, respectfully presents for the consideration of Gas-Light Companies the Circulars and Pamphlet issued by the American Coal Gas-Light Imp. Co., descriptive of the value of GIBSON'S Improvement, and the mode by which Gas-Light Companies can satisfy themselves of its usefulness, without trouble or expense, at their own works.

Orders for fitting up Valves of any desired form or patent, *subject to the generality of the Gibson claim*, and also for SUPPLIES and MATERIALS of every description required for the use of Gas Light Companies promptly attended to by

W. H. GRENELLE, Special Agent.

REFERENCE.—RICHARD MERRIFIELD, ESQ., late Vice President MANHATTAN GAS-LIGHT COMPANY.

WORKS UPON GAS.

BOWDITCH.—THE ANALYSIS, TECHNICAL VALUATION, Purification, and Use of Coal Gas, with illustrations, 8vo. cloth. Price, $6.25.

THE GAS MANAGER'S HAND BOOK; consisting of Tables, Rules, and Useful Information for Gas Engineers, Managers, and others engaged in the Manufacture and Distribution of Coal Gas. By Thomas Newbigging; 8vo. cloth. $3.75.

BOWER—Gas Engineer's Book of Reference, illustrated, 4to. Price, 75c.

CLEGG—Treatise on the Manufacture of Coal Gas, 5th edition, enlarged, 4to, cloth. Price, $10.50.

COLBURN—The Gas Works of London, 12mo, boards. Price, 60 cents.

CROLL—Report of the Proceedings on the Arbitration with the Great Central Gas Consumer's Company, 8vo., cloth. Price, $2.50.

HUGHES—Gas Works and Manufacturing Coal Gas, 12mo. Price, $1.50.

MASON—The Gasfitter's Guide, paper. Price, 50 cents.

D'HURCOURT—De l'Eclairage du Gas. Par E. R. Hurcourt, 3d edition. Paris, 1863; 8vo. and plates, $7.50.

RICHARD—Gas Consumer's Guide, 12mo. Price, 50 cents.

SWEET—Special Report on Coal, showing its Distribution, Classification, and Cost, delivered over different routes to various points in the State of New York, and the principal cities on the Atlantic Coast. By S. H. Sweet, with Geological Maps. 1 vol. 8vo. cloth, $3.

SUGG—Gas Manipulation, with a description of the various Instruments and Apparatus employed in the Analysis of Coal and Coal Gas, 8vo., cloth. Price, $7.50.

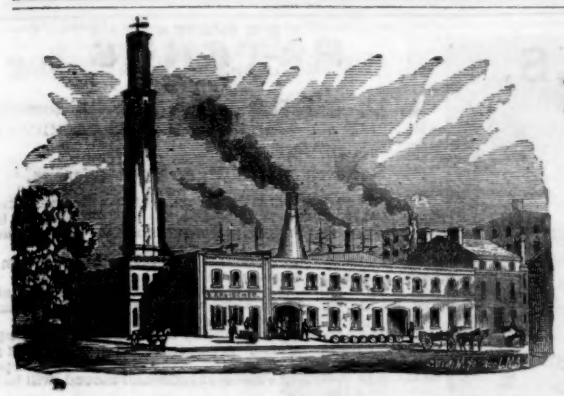
WILKINS—How to Manage Gas; 24mo., paper. Price, 5c.

SCHILLING—Traite d'Eclairage par le Gaz. Price, $22.

For sale by

D. VAN NOSTRAND, Publisher,
23 Murray Street and 27 Warren Street
(Upstairs).

☞ Our new and revised Catalogue of American and Foreign Scientific Books, 56 p. 8vo., sent to any address, on receipt of six cents in postage stamps. 282



NEW YORK
FIRE BRICK AND CLAY
Retort Works.

Established in 1845.
(Branch works at Kreischerville, Staten Island.)

B. KREISCHER & SON,
OFFICE,
58 Goerck Street, cor. Delancy, N. Y.
GAS RETORTS, TILES & FIRE BRICK
Of all shapes and sizes.
FIRE MORTAR, CLAY AND SAND.
Articles of every description made to order at the shortest notice.
B. KREISCHER & SON.

WILSON & GARDNER,
Works, Lockport, Westmoreland Co., Pa,
Office, 96½ Fourth Avenue, Pittsburgh, Pa
MANUFACTURERS OF
CLAY RETORTS, FIRE BRICK, TILE &C.,
From Clay, same species, and equal to best Belgian.
Orders promptly filled.
Improved working plans of Threes and Fives upon application.
REFERENCES.
Gas Works Northwest, West and South.
237-1y

THE PHILADELPHIA & KENSINGTON FIRE BRICK & CLAY RETORT WORKS.

Kensington Fire Brick Works, Beach & Poplar Sts.
Philadelphia Fire Brick Works and Office, 23d & Vine Sts.
Philadelphia Clay Retort Works, St. David & Vine Sts.

PHILIP NEUKUMET,
(SUCCESSOR TO JOHN NEUKUMET),
Manufacturer of Fire Bricks, Tiles, Gas and Sugar House Retorts.
Plans of Settings for Benches of Threes, Fives, and Sixes furnished, free of charge, upon application.

MANHATTAN
FIRE BRICK & ENAMELLED CLAY
Retort Works,
MAURER & WEBER,
(Of the late firm of B. Kreischer & Co.,)
PROPRIETORS.
Office and Works, 15th Street, Avenue C.
Manufactures of
FIRE BRICK AND TILES,
Of all shapes and sizes.
FIRE MORTAR, CLAY AND SAND.
Articles of every description made to order at short notice. (135
HY. MAURER. ADAM-WEBER.

LACLEDE FIRE BRICK
AND
Clay Retort Works,
Cheltenham, St. Louis Co., Mo.
Laclede Fire Brick Manufactnring Co.,
Office, 901 Pine Street. Warehouse, 1007 N. Levee, St. Louis

BROOKLYN
CLAY RETORT AND FIRE BRICK
WORKS,
Van Dyke Street, Brooklyn, N. Y.
MANUFACTURERS OF
CLAY RETORTS, FIRE BRICK, TILE, Etc.

GEO. H. KITCHEN & CO.,
NEW PATENT
Gas Apparatus,
FOR COUNTRY RESIDENCES, PUBLIC BUILDINGS, &C., FROM $300 UPWARDS.
Every Description of Gas Fixtures.
GAS FITTING IN ALL ITS BRANCHES.
691 BROADWAY New York.

MURRAY & BAKER,
Practical Builders,
And Contractors for the Erection of Gas Works,
MANUFACTURERS OF ALL THE LATEST AND MOST IMPROVED APPARATUS AND TOOLS FOR THE MANUFACTURE & DISTRIBUTION OF COAL GAS.
WORKS AT THE RAILWAY DEPOTS,
FORT WAYNE, INDIANA.
We manufacture Bench Castings, Washers, "The Immersed Multitubular," and Atmospheric Condensers, Wet and Dry-Lime Purifiers, Dry Center Seals, Telescopic and Single Gas Holders, Wrought Iron Trussed Roof for Iron or Slate, Wood and Iron Trays for Purifiers, Coke and Coal Carts, Wrought Iron Screening Shovels and Castings, and Wrought Work of every description for Gas-Works.
As Mr. Murray is a Practical Draughtsman, we will furnish plans and specifications to parties or associations, or will wait personally upon parties contemplating the construction of new works, or the alteration or extension of old ones.
The most satisfactory references can be given, if required, of the experience and commercial fairness which characterizes our dealings.
We would respectfully invite Western men to call and see our patterns and works here. MURRAY & BAKER,
198-1y Fort Wayne, Indiana.

JERSEY CITY
GAS METER WORKS.
R. M. POTTER & CO.,
MANUFACTURERS OF
CONSUMERS GAS METERS, WET AND DRY,
Station Meters, Center Seals, Governors,
PRESSURE REGISTERS,
AND ALL KINDS OF PRESSURE GUAGES.
Experimental Meters and Standard Test Gas olders,
And all apparatus in use at the Gas Works
14 Morris St., Jersey City, N. J. (1y

ATLANTIC DOCK
Iron & Machine Works,
FERRIS, WOLCOTT AND DYKEMAN STREETS,
South Brooklyn.
HOY, KENNEDY & CO., AGENTS.
Office 98 Liberty Street. P. O. Box 2,348

HOY, KENNEDY & CO.,
ENGINEERS AND CONTRACTORS
For the Erection or Extension of Gas Works.
PLANS, SPECIFICATIONS AND ESTIMATES.
MANUFACTURERS of every kind of Gas Machinery, Retorts Bench Castings, Wrought Iron Work, Multitubular and Air Condensers, Washers, Scrubbers, Purifiers, Exhausters with every equipment complete for large or small Works, Gasholders, Telescopic or Single; Iron Roof Frames with Cornice Gutters, covered with Corrugated Iron or Slate; Iron Doors and Iron Pivot Blind Windows; Coke Barrows, Fire Tools, Retort Lids, Cotter Bars and Screws, Stop Valves, Tar Valves for Regulating Dip in Hydraulic Mains, Pressure Governors for Street Mains, and Compensators for Exhausters that are unrivalled for unvarying accuracy Steam Engines, Boilers, Etc., Etc.
Agents for G. W. EDGE'S PROCESS for removing Carbon from Retorts.
Post Office Box 2,348. Office 98 Liberty st., N. Y. (224-1y

RILEY A. BRICK & CO.,
MANUFACTURERS OF
CAST IRON PIPES,
FOR WATER AND GAS,
ALSO,
GAS WORKS & MACHINERY CASTINGS
OF EVERY DELCRIPTION,
No. 89 White Street, New York.
RILEY A. BRICK. JAS L. ROBERTSON

KEYSTONE IRON WORKS,

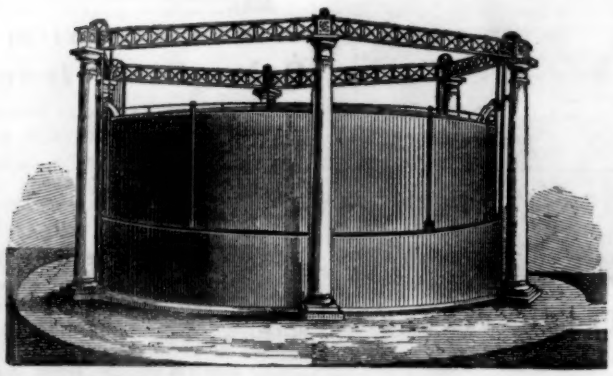
2132 FILBERT STREET, Philadelphia,

G. W. KRAFT, PROPRIETOR,

MANUFACTURES

GASOMETERS.

COAL CARS, PURIFYING BOXES, COKE BARROWS.



RETORT HOUSE ROOFS, WATER TANKS.

Wrought Iron Work for Bridges, Buildings, Steam Boilers, Tanks, Stills, &c.

Particular Attention paid to Alterations and Repairs.

PROVIDENCE

Steam & Gas Pipe Co.,

PROVIDENCE, R. I.,

BUILDERS OF

Coal and Rosin Gas Works,

FOR TOWNS AND MANUFACTORIES.

Estimates furnished of the cost of Works, and cost to Manufacture Gas in any Locality.

Gasholders,

Iron Truss Retort House Roofs,

Water Tanks,

Purifier Covers,

Coke Barrows,

Cast Iron Socket Pipe.

Particular attention given to Enlarging and Re-building Gas Works.

For Lighting Manufactories, our Rosin Gas Works have been successfully used for *many years* past. They require but a small outlay, and afford a *safe* and *economical* light.

FOR SALE AT MANUFACTURERS PRICES:

EXHAUSTERS AND COMPENSATORS,
IRON AND CLAY RETORTS,
FIRE BRICK, CLAY AND TILE,
ROMAN CEMENT AND ROSIN,
STATION AND CONSUMERS' METERS.

REFER TO

Manufacturers' Gas Co., Fall River, Mass.; Youngstown Ohio, Gas Co.; New Rochelle, N. Y., Gas Co.; Homer and Cortland, N. Y. Gas Co.; Danbury, Conn., Gas Co.; North Bridgewater, Mass., Gas Co.; Cold Spring, N. Y., Gas Co., Rockville, Conn., Gas Co.; Taunton, Mass., Gas Co.; Pawtucket, R. I., Gas Co.

FREDERICK GRINNELL, President, J. C. HARTSHORN, Treas,
S. MILLETT THOMPSON, Secretary.

Office and Manufactory, corner of Pine and Eddy Streets, Providence, Rhode Island.

Office in Syracuse, N. Y., No. 1 Granger Block.

H. A. BRANCH, Agent.

MITCHELL, VANCE & CO.,

Manufacturers of

CHANDELIERS!

And Every Description of

GAS FIXTURES,

Also Manufacturers of

Fine Gilt, Bronze and Marble Clocks, warranted best Timekeepers, Mantle Ornaments, &c.

Salesroom, 579 BROADWAY,

(Rear Entrance 140 Mercer Street,)

NEW YORK.

Special designs furnished for Gas Fixtures for Churches Public Halls, Lodges, &c.

Smith & Ellis,

IRON FOUNDRY & PIPE WORKS,

Philadelphia.

SEVERAL THOUSAND 3, 4 AND 6 INCH CAST IRON GAS PIPES ON HAND, FOR IMMEDIATE DELIVERY.

☞ GAS WORKS CASTINGS OF ALL KINDS.

236 6m

P. P. DEILY, J. FOWLER.

DEILY & FOWLER,

39 LAUREL STREET, PHILADELPHIA, PENN.,

BUILDERS OF

GAS WORKS,

MANUFACTURERS OF

GAS-HOLDERS,

WROUGHT IRON ROOFS,
CHARGING-SCOOPS, COAL WAGONS,
COKE BARROWS, AND ALL WROUGHT
WORK CONNECTED WITH GAS-WORKS.

Particular attention paid to the Extension of Works and Repairs to Gasholders, Purifiers, Etc.; also, Builders of Water Tanks, Oil Stills, Etc.

REFER TO

M. H. Jones, Easton Gas Co., Penn.
Franklin Woolman, Burlington Gas Co., N. J.
O. W. Goodwin, Camden Gas Co., N. J.
Benjamin Acton, Salem Gas Co., N. J.
D. H. Smith, Watkins Gas Co., Watkins, N. Y.
W. F. Warner, Oswego Gas Co., N. Y.
E. Wilcox, Joliet Gas Co., Ill.
Messrs. Woodbury, Walter & Potter, Kalamazoo Gas Co., Michigan.
H. H. Fish, Utica Gas Co., N. Y.
W. J. Ball, Terre Haute, Indiana.

(TO BE PUBLISHED SHORTLY.)

"A SYNOPSIS OF BRITISH GAS-LIGHTING."

900 *pages, large 4to, profusely illustrated.*

This is the only compend of Gas-Lighting ever projected, and will be the standard work of reference among Companies, Manufactures, Engineers, Patentees, and Scientific Men generally.

Price $15, payable on delivery.

It will be sold only by subscription, which should be addressed to the compiler, JAMES R. SMEDBERG, Consulting Engineer S. F. Gas Co., San Francisco, Cal., or Editors AMERICAN GAS-LIGHT JOURNAL No. 42 Pine street, N. Y.

PATENTS.

A. M. CALLENDER & CO., Proprietors of the AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY, give their

Attention to Patent Business.

We have associated with us parties who have been directly connected with the Patent Office for many years, and have acquired an experience in Patent matters of over *twenty* years

We have also unusual facilities for obtaining Patents in the various European countries with *certainty and despatch.*

Oral and written opinions as to whether inventions contain features of patentable novelty, will be given upon personal or written application, *free of charge.*

We supply finished drawings by the best artists, and where necessary the model also. A circular, containing a list of fees and other valuable information as to the preliminary steps to be taken in obtaining Patents at home and abroad, will be furnished by addressing

A. M. CALLENDER & CO.,
Solicitors of Patents, 42 Pine street.

AMERICAN GAS SCREENS.

THE ATTENTION OF SUPERINTENDENTS AND MANAGERS of Gas Works is called to the following, from a well known Superintendent of one of the most complete Gas Works in the country:

PROVIDENCE, RHODE ISLAND, March 21, 1871.

LUTHER DAY, Esq., Agent, Etc.

Dear Sir: The Trays manufactured by you for our West Station were put in use in September last, and have *given perfect satisfaction.*

The frames are well put together, and I see no reason why they will not last for a long time. The *very large amount of open space* in these Trays gives the gas an easy passage, and brings it into contact with the lime much better than when the space is so contracted, as is the case in most of the other Trays in use.

The pressure thrown upon the retorts by contracted passages is very great, and were gauges used more frequently than they now are in many gas works, this fact of having *open Trays* would become more apparent to managers of gas works. The difference in pressure at this station in passing the gas through your purifiers, is two-tenths (2-10) inches.

The amount of gas purified, per bushel of lime used to this date, is six thousand five hundred and fifty-six (6,556) cubic feet.

Respectfully yours,
JAMES H. ARMINGTON, Sup't.

There are over sixty Gas Companies using our Screens, which are made of oak and rattan; are light, strong, and durable, and the most economical, for reasons set forth in the above letter.

We have just had completed improved machinery, which will enable us to ensure a thorough made Screen, of even greater strength than heretofore.

Orders solicited for immediate delivery, or in the Fall.

Am. Gas Screen Manufacturing Co.,

Haverhill, Mass. 244-3m

NOW READY AND FOR SALE,

FODELL'S

System of Bookkeeping

FOR GAS COMPANIES.

Price $5, which should be sent either in Check, P. O. Order, or Registered Letter.

Blank Books, with printed headings and forms on this system, will be supplied to Gas Companies, by applying to W. P. FODELL, Philadelphia, or

A. M. CALLENDER & CO.,
Office GAS-LIGHT JOURNAL, 42 Pine St., N.Y.

SABBATON'S PATENT Coke and Coal

SCREENING SHOVELS.

MADE FROM BEST MALLEABLE IRON.

FURNISHED WITH LONG OR D HANDLES.

Perfect in their operation. Very strong, and from their great durability vastly more economical than any substitute. Refer to all the principal Gas Companies in the country, who acknowledge them as the "ne plus ultra" of Coke Screening Shovels.

Orders addressed only to

O. R. BUTLER,

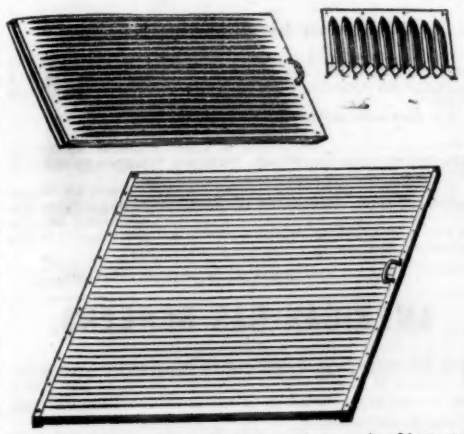
Sole Agent.

No. 96 Maiden Lane, N. Y.

J. L. Cheesman,

MANUFACTURER OF

Patent Conically and Diamond Slotted Solid Wood Trays.



The dvantages of these Trays over those made of iron, are economy (they being over 200 per cent. cheaper than iron and will last twice as long), a greatly increased purifying surface, and a saving of time and labor in removing lime, as it does not adhere to the smooth surface of the Wood Trays, as is the case with the iron. The top cut represents the new diamond slotted or reversable Tray, a very superior improvement.

JOHN L. CHEESMAN,
151 and 153 Avenue C, New York.

CHELTENHAM

Fire Brick and Clay Retort Works.

EVENS & HOWARD,

PROPRIETORS,

MANUFACTURERS OF

FIRE BRICK,
CLAY RETORTS,
GAS HOUSE TILE,
BLAST FURNACE TILE,
CHIMNEY TOPS,
SEWERAGE PIPE from 3 to 30 inch diameter,
SUPERIOR DRY MILLED FIRE CLAY, ETC

OFFICE, 100 SOUTH ELEVENTH STREET.

241-1y St. Louis, Mo.

GRAHAMITE,

OR

RITCHIE MINERAL.

This Asphalt, after the severest tests and comparisons has been adopted, and is largely used by the principa Gas-Light Companies, and will be furnished by the Company at rates far below its intrinsic value. Its yield is 15,000 cubic feet per ton of 32 Candle Gas, as repeatedly established by the Manhattan Gas-Light Company and the Philadelphia City Gas Works, which is *four times* the value of ordinary Gas Coals.

Our vein being near the Ohio River, affords facilities for Western transportation. One bushel Lime purifies 6000 feet. Coke 26 bushels per ton—"very good." Proportion usually required for enrichment, five per cent.

The Ritchie Mineral Resin and Oil Co.

7-6m No .27 South Charles Street, Baltimore.

Bird, Perkins & Job,

IMPORTERS OF

Pictou,
Sydney,
Lingan,
Glace Bay,
Caledonia,
Newcastle and Westmoreland

COAL,

ALSO,

Ince Hall and Red Bank House Cannel.

39 INDIA WHARF, Boston. 86 SOUTH ST., N. Y. [248

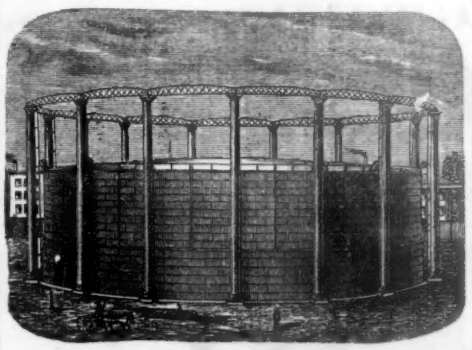
T. F. ROWLAND,

Continental Works,

Greenpoint, Brooklyn, N. Y.

NEW YORK OFFICE, 64 & 66 BROADWAY, (ROOM 33.)

ENGINEER, AND MANUFACTURERS OF



GAS-HOLDERS

OF ANY MAGNITUDE,

Condensers, Scrubbers, Purifiers, Retorts, Hydraulic Mains, and all other articles connected with the Manufacture and Distribution of Gas, furnished with despatch. Plans and Specifications prepared, and Proposals given for the necessary Plans for Lighting Cities, Towns, Mansions, and Manufactories.

B. S. BENSON & SON,

No. 112 BROADWAY, N. Y., ROOM 1.

MANUFACTURERS OF

CAST IRON GAS & WATER PIPE,

And Fittings for Gas & Water Mains, &c.

All sizes from 3 to 30 inches, cast vertically, in lengths of 12½ feet.

SCHOOL OF MINES,

COLUMBIA COLLEGE,

EAST 49th STREET, NEW YORK.

FACULTY:

F. A. P. BARNARD, S.T.D., LL.D., President.
T. EGLESTON, Jr., E.M., Mineralogy and Metallurgy.
FRANCIS L. VINTON, E.M., Mining Engineer.
C. F. CHANDLER, Ph. D., Analytical and Applied Chemistry.
JOHN TORREY, M.D., LL.D., Botany.
CHARLES A. JOY, Ph.D., General Chemistry.
WILLIAM G. PECK, LL.D., Mechanics.
JOHN H. VAN AMRINGE, A.M., Mathematics.
OGDEN N. ROOD, A.M., Physics.
JOHN S. NEWBERRY, M.D., Geology and Palaeontology.

The plan of this School embraces a three years' course for the degree of Engineer of Mines, or Bachelor of Philosophy.

For admission, candidates for a degree must pass an examination in arithmetic, algebra, geometry and plain trigonometry. Persons not candidates for degrees are admitted without examination, and may pursue any or all of the subjects taught. For further information and for catalogue, apply to

DR. C. F. CHANDLER,
252-1y Dean of the Faculty.

THE NEWBURGH

Orrel Coal Company,

Mines at Newburg, Preston County, W. Va.
Company's Office, No. 52 S. Gay Street, Baltimore, Md.
C. OLIVER O'DONNELL, Pres't. CHAS. MACKALL, Sec'y.
CHAS. W. HAYS, Agent in New York, Room 7, Trinity Building, 111 Broadway.
SINCLAIR & AGNEW, Agents, Alexandria, Va.

This Company offer their very superior Gas Coal at lowest market prices.

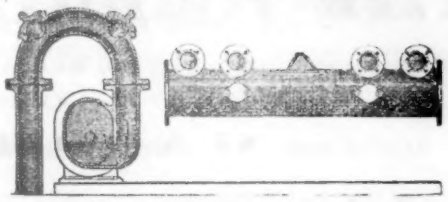
It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York; the Brooklyn and Citizen's Gas Light Companies of Brooklyn, N. Y.; the Baltimore Gas Light Company of Baltimore, Md., and and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. 224-1y.

STANLEY'S

HYDRAULIC GAS MAIN.



WILLIAM TAYLOR & SONS,

Columbian Iron Works,

Nos. 11, 13 and 15 Adams Street,

BROOKLYN, N. Y.

MANUFACTURERS OF ALL KINDS OF

CASTINGS, IRON BUILDINGS, STORE FRONTS, COLUMNS, GIRDERS AND BEAMS.

ALSO,

Gas Works Castings of all kinds.

Steam Engines, Mill Gearing, Hydraulic Presses for the manufacture of Linseed and Cotton Seed Oils, Sugar Mills, Single and Double Action Pumps, also Steam Pumps, Coal Oil Machinery, High and Low Pressure Boilers, Tanks, Kettles, Soap Curbs, &c.,

MADE AND REPAIRED AT THE SHORTEST NOTICE.

WM. TAYLOR. JAMES A. TAYLOR. EDWIN S. TAYLOR.

Curley's Improved Retort Setting and Independent Damper.

Prevents the sudden Chilling Contraction, and early Destruction of the Retorts; more than doubles their durability, and maintains a high uniform heat.

For particulars address THOMAS CURLEY, Wilmington Del., or C. E. Sanderson, 42 Pine street, N. Y., Room 18.

258-tf

S. L. MERCHANT & CO.,

IMPORTERS OF

ENGLISH & SCOTCH FIRE BRICK,

Chalk, Fire Clay, Retorts, China Clay, and Paris White.

No. 76 South Street, New York.
No. 205½ Walnut Street, Philadelphia.
No. 27 Central Wharf, Corner Atlantic Avenue, Boston. 248-3m

WILLIAM S. CARR & CO.,

SUCCESSOR TO SAWYER & CO.,

SOLE MANUFACTURERS OF

Carr's Patent Water Closets,

URINAL VALVE, &c.

Also Manufacturers and Dealers in PLUMBING MATERIAL OF EVERY DESCRIPTION Plumbers' Brass Work, Earthen Ware, Pumps, Iron Drain Pipes, Traps, and Sinks, Copper Bath Tubs Showers, &c., &c.

MANUFACTORY, MOTTHAVEN.

106, 108, and 110 Centre Street, cor. Franklin,

NEW YORK.

Illustrated Catalogue and Price List sent on application. 152-176

GEO. STACEY. HENRY RANSHAW. WM. STACEY

GEO. STACEY & CO.,

MANUFACTURERS OF SINGLE AND TELESCOPIC

GAS-HOLDERS,

AND ALL KINDS OF

Cast and Wrought Iron Work

Used in the Erection of Gas and Coal Oil Works.

Foundry on MILL STREET; Nos. 33, 35, 37 and 39.
Office and Wrought Iron Works on RAMSAY STREET, Cincinnati, Ohio.

REFERENCE.

Cincinnati Gas-Light Co.	Baton Rouge, La., Gas Co.
Indianopolis Gas Co.	Saginaw, Mich., Gas Co.
Dayton, O., Gaslight Co.	Oshkosh, Wis., Gas Co.
Covington, Ky., Gas Co.	Peoria, Ill., Gas Co.
Springfield, O., Gas Co.	Quincy, Ill., Gas Co.
Terre Haute, Ind., Gas Co.	Champaign, Ills., Gas Co.
Madison, Ind., Gas Co.	Carlinville, Ill., Gas Co.
Kansas City, Mo., Gas Co.	Bowling Green, Ky., Gas Co.
Topeka, Kansas, Gas Co.	Hamilton, Ohio, Gas Co.
Burlington, Iowa, Gas Co.	Vicksburg, Miss., Gas Co.
Nashville, Tenn., Gas Co.	Denver City, Cal., Gas Co.

R. T. Coverdale, Eng'r Cincinnati, and others.

THE AMERICAN METER COMPANY.

Organized under the General Manufacturing Laws of the State of New-York.

SAMUEL DOWN, PRESIDENT. HENRY CARTWRIGHT, VICE-PRESIDENT. THOMAS J. EARLE, SECRETARY.

TRUSTEES:

SAMUEL DOWN WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, Superintendent at Philadelphia.

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all articles in their line appertaining to the use of Gas Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of Workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty-Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. 321 Washington Street, Boston, will meet with prompt attention.

BALTIMORE RETORT AND FIRE BRICK WORKS.

GEO. C. HICKS & CO.

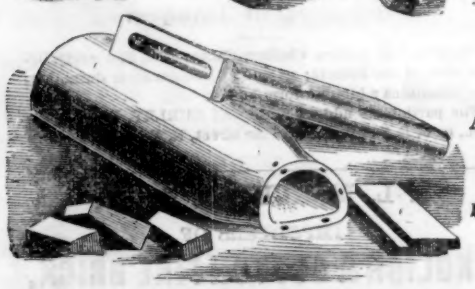
CLAY RETORTS FOR GAS WORKS AND SUGAR REFINERIES.

TILES AND BLOCKS OF ALL KINDS.

FIRE BRICK.

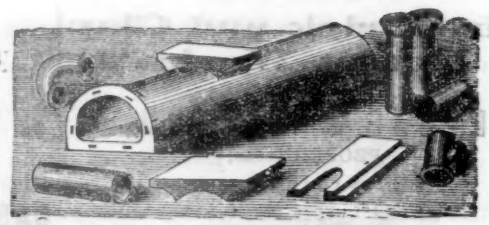
FIRE MORTAR, CLAY AND SAND.

ALL KINDS OF FIRE CLAY MATERIALS



The Only XX Fire Brick.

☞ RETORTS OF THE VARIOUS SIZE KEPT ON HAND.



Vitrified Steam Pressed Drain and Sewer Pipe.

HARRIS & BROTHER,

ESTABLISHED 1848.

PRACTICAL GAS METER MANUFACTURERS,

Continue as heretofore at the OLD ESTABLISHMENT, Nos. 1115 and 1117 Cherry Street, Philadelphia, Pa.,

To manufacture Wet and Dry Gas Meters, Station Meters, Experimental Meters, Meter Provers, Centre Seals, Governors, Pressure Registers, Indicators, Photometers, and all kinds of Gas Apparatus; Also furnish all other Articles appertaining to the use of Gas Works.

From our long Practical Experience of the Business (covering a period of 20 years) and from our personal supervision of all Work, we can guarantee all orders to be executed promptly, and in every respect satisfactorily.

J. Wesley Harris, Washington Harris, Wm. Wallace Goodwin.

GAS PURIFICATION.

St. John and Cartwright's
NEW IRON COMPOSITION

Has purified, per bushel, on a single test, 10,000 feet of Westmoreland Gas. With revivification lasts indefinitely. Surpasses in POWER and ECONOMY all known materials. Saves largely in FIRST COST, SPACE, LABOR, SUPERINTENDENCE, and all current expenses. Will purify *easily* sulphurous gas, wholly *unmanageable by lime.* Takes out *all the ammonia.* Now operating in the following Gas Works: Harlem; New York (21st street); Port Morris; Hunter's Point; East New York; Worcester, Lynn and Cambridge, Mass.; Lewiston, Maine; St, Albans, Vt.; Pawtucket, R. I.; Meriden, Ct., and being introduced in many other places.

Cost 70 cents per bushel. One bushel for each square foot of Purifier sufficient. Rights to use for life of Patents, for daily makes of gas in thousands; under 25,000 $200; under 50,000, $400; under 100,000, $500; $250 additional for each additional 50,000 per day.

For further information and instructions, apply to

ST. JOHN & CARTWRIGHT,
21st Street and Avenue A, New York Gas Works.

☞ Immediate arrangements are urged, as the demand for the prepared composition is increasing *so rapidly* that delays in supply may occur.

PREMIUM GAS STOVES,

New, Cheap, Clean, Simple and Healthful. No oder, no Dirt, no Soot, no Ashes, no Coal Box, no Punching and Renewing Fire.

The Cambridge Gas Stove.

This truly scientific invention received the premium at the State Fair at St. Louis, and is being introduced at the West and also in the New England States, with great success. Certificates of its excellence and superiority from some of our most scientific and influential men are voluntarily given, and will be furnished upon application.

These stoves may be seen in operation at No. 42 Pine street, Room 18, where information may be obtained.

F. O. KETCHAM & CO.,

WHITE LUBRICATING, MACHINERY, PARAFINE AND KEROSENE OILS,

Naphtha and Gasoline for Gas Machines, and Vapor Burners.

SOLE MANUFACTURERS OF

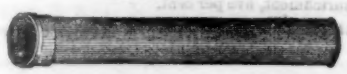
CAPT. S. PEPPER'S EXTRA SIGNAL OIL.

Office, 105 Maiden Lane; Factory, Furman St., Brooklyn.

F. O. KETCHAM [265-1y] GEO. N. WESTON.

B. S. BENSON,

MANUFACTURER OF



Cast Iron Pipes and Fittings,

AND

GAS AND WATER MAINS.

All sizes from 3 to 30 inch cast vertically in 12½ feet lengths

Office & Factory 52 East Monument St.,

BALTIMORE, MD.

The Aubin Balanced

VALVE WATER METER,

(Used also for Oils and Liquors.)

Is now in use by many city water companies, because of its LOW PRICE, Simplicity, Durability, Accuracy under any pressure, and, (a great advantage) because it runs with less head than any other meter used.

Manufactured by H. Q. HAWLEY, Albany, N. Y.

R. D. WOOD & CO.,

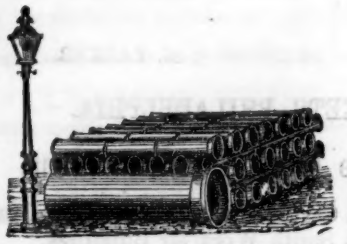
PHILADELPHIA.

MANUFACTURERS OF

CAST IRON GAS & WATER PIPES,

Matthews Patent Hydrants,

Lamp Posts, Etc.



For the accommodation of parties who may want small lots Pipe for *immediate* delivery, we have established a yard in New York City.

We have on hand here several thousand feet of small Pipe, from which we can ship orders readily to any part of the country.

H. G. H. TARR, Selling Agent,

No. 173 Broadway, New York,

3-tf SECOND FLOOR.

BLANCHARD & ARNOLD,

Excelsior Car Wheel Works,

Cor. Fourth and Fowler Sts., Milwaukee.

MANUFACTURERS OF

Gas Apparatus,

Bench Castings,

Air and Immersed Tubular Condensers,

Improved Dry Scrubbers,

Purifiers with Imp'd Dry Centre Valves,

and every description of apparatus necessary for large or small Gas Works.

The designs for our apparatus are furnished by JAMES H. WALKER, Engineer and Superintendent Milwaukee Gas Works, who can be consulted on all matters relating to the working, erection of new, or extension of old works.

Parties employing us will find their orders promptly attended to, and satisfaction guaranteed in all cases.

The best references given on these points. 244-6m

S. FULTON & CO.,

PLYMOUTH IRON WORKS,

CONSHOCKEN, PA.,

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heay and Light Castings of every description.

412 Walnut street, Philadelphia, Pa.

SAMUEL FULTON, THEO. TREWENDT

AMERICAN

JOURNAL OF SCIENCE & ARTS,

FOUNDED BY PROF. SILLIMAN IN 1818,

And now numbering 100 volumes, in two Series of 50 vols. each.

Editors and Proprietors: Profs. Silliman and Dana.

Associate Editors: Profs. Gray and Gibbs of Cambridge, and Newton, Johnson, Brush and Verrill of Yale.

Devoted to Chemistry, Physics, Geology, Mineralogy, Natural History, Astronomy, Meteorology, etc.

A Third Series in MONTHLY numbers, making two volumes a year of about 450 pages each, from January, 1871. Subscription price $6.00 a year, or 50 cents a number.

A few complete sets on sale of the first and second series.

Address, **SILLIMAN & DANA,** New Haven, Ct.

DENNIS LONG & CO.,

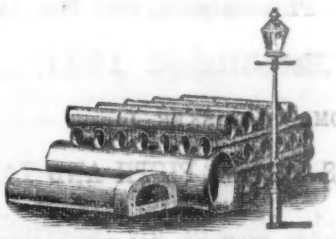
Union Pipe Works,

Louisville Pipe Foundry,

AND

Union Foundry and Machine Shops,

LOUISVILLE, KY.



MANUFACTURE

Cast Iron Gas and Water Pipe,

All Pipe cast vertically in dry sand.

2 inch Pipes in 8 feet lengths. 3 inch to 60 inch cast in 12 feet lengths.

RETORTS AND MOUTH PIECES, LAMP POSTS, CONDENSING PIPE, HYDRAULIC MAINS, PURIFIERS, DRIPS, ELBOWS, T'S, CROSSES, SLEEVES, VALVES, &c., &c.

GAS-HOLDERS.

And every description of work necessary for Gas or Water Companies.

NATIONAL FOUNDRY

AND PIPE WORKS.

OFFICE AND WORKS—CARROLL, PIKE, SMALLMAN AND WILKINS STREETS,

PITTSBURGH, PA.

WM. SMITH,

Manufacturer of all kinds of GAS and WATER PIPE, BRANCHES, CONNECTIONS, T's, ELBOWS, and all CASTINGS USED AT GAS AND WATER WORKS,

We offer special inducements to parties wishing to purchase. My Pipe is Smooth, regular in weights, and cast vertically.

N. B.—Pipe from 3-inch and upwards, cast in 12-ft. lengths.

☞SEND FOR CIRCULAR AND PRICE LIST.☜

JESSE W STARR & SONS,

Camden Iron Works

Camden, New Jersey,

MANUFACTURERS OF

ALL KINDS OF CASTINGS AND APPARATUS FOR GAS WORKS,

WROUGHT IRON ROOF FRAMES,

For Retort and other houses. Retorts and all castings required for setting them in the latest and most improved model. WASHERS, CONDENSERS, SCRUBBERS and EXHAUSTERS, for relieving the Retorts from pressure. PURIFIERS, varying from 2,000 to 2,000,000 cubic feet daily purifying capacity.

Wrought Iron Lime Sieves,

for Purifiers. Station Meters of all sizes.

GAS HOLDERS,

TELESCOPIC AND SINGLE,

With cast iron guide and suspension frames. GAS GOVERNORS or REGULATORS, STREET MAINS, from 1½ to 48 INCHES DIAMETER, for WATER or GAS. Street Main connections, such as BRANCHES, BENDS, DRIPS, SIEVES, etc.

STOP VALVES, from 3 to 30 inches, for both Water and Gas.

WROUGHT IRON WORK.

All the Smith and Sheet Iron work required in and about Gas Works. 226-tf

JESSE W. STARR. BENJ. A. STARR. BENJ. F. ARCHER.

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.

Agents, PARMELEE BROTHERS, No. 32 Pine street, N. Y.

BANGS & HORTON, No. 31 Duane street, Boston.

Mines in Harrison County, West Virginia.

Wharves Locust Point, Company's Office, 29 South street, } Baltimore.

Among the consumers of Despard Coal, we name: Manhattan Gas Light Company, New York; Metropolitan Gas Light Company, New York; Jersey City Gas Light Company, N. J.; Washington Gas Light Company; Portland Gas Light Company, Maine.

*** Reference to them is requested.] 204-1y

OREGON IRON FOUNDRY.

738, 740 742 & 744 Greenwich Street,

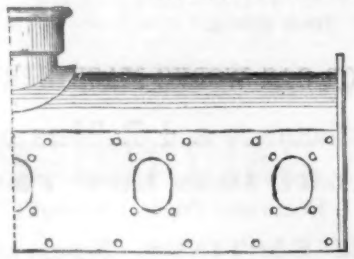
NEW YORK.

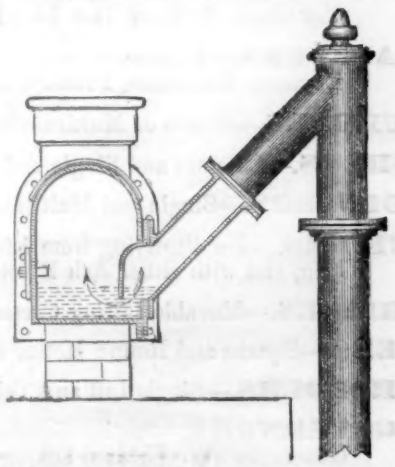
Castings for Gas Works

OF ALL DESCRIPTIONS

INCLUDING

PURIFIERS, EXHAUSTERS,
COMPENSATORS,
SELF-ACTING VALVES
BRANCHES, BENDS, &c.





FLOYD'S PATENT ADJUSTABLE MAIN,

FOR BENCHES OF 1, 2, 3, 5 and 6 RETORTS.

By the removal of the front plate only the Main can be adopted to Settings of any number of Retorts desired. The Patent Main can be applied to the ordinary D shaped Main. It offers great facilities for cleaning, and is not liable to stoppage.

FLOYD'S PATENT

Malleable Iron Retort Lid.

SABATTON'S PATENT

FURNACE DOOR AND FRAME.

REFERS TO—J. A. Sabatton, Esq., Engineer Manhattan Gas Co.—Col. A. J. White, Metropolitan Gas Co.—C. C. Mowten, Engineer New York Gas Light Co.—J. Mowten Saunders, Engineer Baltimore Gas Co.—John T. Harrison, Engineer Savannah Gas Co.

236] **HERRING & FLOYD, Proprietors.**

SILAS C. HERRING. JAMES R. FLOYD.

DAVIS'S

PATENT PRESSURE RECORDER

FOR STEAM, GAS, AIR OR WATER.

The *only* Instrument that gives a continuous *Steam Written* record of the Pressure and the *Time* of all variations in Pressure, in Steam Boilers, etc.

Send for Circulars to CHARLES G. WILLING, Manufacturer, 88 John street, New York, or D. P. DAVIS, 44 Courtlandt street, New York. 245-3m

---

C. GEFRORER. JOHN R. MANDERFIELD, JR.

GEFRORER & MANDERFIELD,

Manufacturer of

GAS BURNERS,

GAS HEATING AND COOKING APPARATUS,

FITTERS' PROVING APPARATUS. ETC.,

No. 248 North Eighth Street, Philadelphia.

A RARE CHANCE FOR GAS MEN.

FOR SALE.—A COAL GAS WORKS, SITUATE IN A growing and thriving Southern city, now being rapidly developed by railroads. There is a good brick building sufficiently large for Retort Room, Purifying Room, Office and Meter Room. Present consumption from 90,000 to 120,000 feet per month. In the hands of an expert it can be made to yield a handsome income. Can be had on easy terms.

Further particulars can be had by addressing the Editor of this Journal. 241-tf

MORRIS, TASKER & CO.,

PASCAL IRON WORKS,

Corner Fifth and Tasker Streets, Philadelphia, and No. 15 Gold Street, New York.

Established 1821,

STEPHEN MORRIS, THOMAS T. TASKER, JR., STEPHEN P. M. TASKER.

FOR GAS WORKS MACHINERY, ADDRESS CORNER FIFTH AND TASKER STREETS, PHILADELPHIA.

Manufacturers and Builders of Gas Works, &c., of all Descriptions, of the Most Approved Plans.

WROUGHT IRON ROOF FRAMES.—For Slate, or Corrugated Iron Coverings, with Cast Iron Cornice Gutter. Iron Doors and Frames, Wrought Iron Pivot Blinds, Windows and all kinds of Castings and Smith Work for Buildings.

BENCH CASTINGS.—Retorts, and all Castings and Wrought Iron Work required for Setting them on the Latest Plan. Tar Gates, Wrought Iron Stand Pipes, Retort Lids, Cotter Bars, Coal and Coke Wagons, and Stokers' Tools.

EXHAUSTERS.—Exhausters and Compensators, By-Passes to pass from 4,000 to 150,000 Cubic feet of Gas per hour, with Engines, Governors, Pressure and Vacuum Guages.

SCRUBBERS.—Single or Multitubular Scrubbers, with Self-Acting Pumps for Ammonia Water.

WASHERS.—Cataract and Single and Multitubular Spray Washers.

CONDENSERS.—Single and Multitubular Air and Water Condensers.

PURIFIERS.—For Purifying from 1,000 to 2,000,000 cubic feet capacity daily, with either wet or dry Lime, or Oxide of Iron, and with either Ash Rivetted or Wrought or Cast Iron Lime Sieves.

CARRIAGES.—Movable Lifting Carriages for Purifiers, arranged either for Floor or Overhead use.

METERS.—Square and Round Meters of any capacity.

GAS HOLDERS.—Single Lift and Telescopic Gasholders, with Cast or Wrought Iron Suspension Frames.

GAS GOVERNORS.—Station Governors, with Regulating and Indicating Columns for Inlet and Outlet Pipes, also Dry Governors with Flexible Diaphragms for Underground Pipes.

STOP VALVES.—Double Faced Stop Valves for Gas or Water, from three inches to forty-eight inches diameter. These Valves are proved on both sides, with a heavy Water Pressure, Flange and Bell Pipes, Fittings and Drips of all descriptions. Steam Boilers and Hot Water Apparatus for Heating Building, and Gas Holder Tanks. Lamp Posts and Lanterns.

Best quality American Charcoal Iron Boiler Tubes. Wrought Iron Tubes from one-eighth of an inch to ten inches diam., with all kinds of Fittings, Valves and Cocks, Gas and Steam Fitters' Tools, and all articles connected with the manufacture of Gas, Steam or Water.

Sole Manufacturers of P. MUNZINGER's Patent Purifiers, Dry Center Seals, Adjustable Hydraulic Main Stand, Wooden Lime Trays, Stand and Straddle Pipes, and Multitubular Water Condenser.

MR. P. MUNZINGER, Gas Engineer, has been connected with our Establishment as Engineer and Designer, and in charge of the Gas Works Department for the past fifteen years.

Plans, Specifications, and Estimates furnished, for Lighting up Towns, Cities, Factories, and Public Buildings, etc., etc., with Gas from Coal, Rosin, or Wood.

We would refer to the Gas Machinery erected by us, and in operation, at the following places:

Philadelphia, Pa.
Williamsport, Pa.
Altoona, Pa.
Willkes Barre, Pa.
Honesdale, Pa.
Harrisburgh, Pa.
Erie, Pa.
Hanover, Pa.
Easton, Pa.
Lancaster, Pa.
Lock Haven, Pa.
McKeesport, Pa.
Allentown, Pa.
Lebanon, Pa.
Uniontown, Pa.
Washington, Pa.
Hudson City, N. J.
New Brunswick, N. J.
Salem, N. J.
Newark, N. J.
Freehold, N. J.
Englewood, N. J.
Jersey City, N. J.
Elizabeth, N. J.
Camden, N. J.
Flemington, N. J.

Metropolitan Works, N. Y. City.
Binghamton, N. Y.
Rome, N. Y.
Utica, N. Y.
Port Jervis, N. Y.
Elmira, N. Y.
Niagara Falls, N. Y.
Flat Bush, N. Y.
Westchester Co., N. Y.
Batavia, N. Y.
Fredonia, N. Y.
Columbus, Ohio.
Mansfield, Ohio.
People's Works, Cleveland, Ohio.
Newark, Ohio.
Salem, Ohio.
Wooster, Ohio.
People's Works, Chicago, Ill.
Chicago Gas-Light and Coke Co., Ill.
Jacksonville, Ill.
Peoria, Ill.
National Asylum for Discharged Volunteer Soldiers, Milwaukee, Wis.

Detroit, Mich.
La Porte, Ind.
Lawrence, Kansas.
Salem, Oregon.
Port-au-Prince, Cal.
San Jose, Cal.
Stockton, Cal.
Illinois State Penitentiary, Joliet.
Hartford, Conn.
Hagerstown, Md.
Peoples Works, Baltimore, Md.
Elkton, Md.
Milledgeville, Ga.
Augusta, Ga.
New Orleans, La.
Shreveport, La.
Louisiana Ice Manufacturing Co.
Nashville, Tenn.
Murfreesboro, Tenn.
Jackson, Miss.
Houston, Texas.
Galveston, Texas.
And a number of others.

☞ See page for Index to Advertisements.